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THE FIRST BOOK.

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Chap. 1. *Of Philosophy in General.*

THe words *Sophia* and *Philosophia*, are of kin one to another; the former being of more Ancient use then the latter. For those Men who were by the French termed *Druides*; by the Ægyptians, *Priests*; by the Persians, *Magi*; by the Indians, *Gymnosophists*, *Brachmans* and *Samanei*; being persons wholly emploied in the Inquisition of Truth, and reputed to excell all others in the knowledg of great and excellent things: they, by the Ancient Greeks were termed *Sophoi* and *Sophistai*, that is to say Wise-men or Sages.

And, Because this Title, seemed in it self, too much savoring of Arrogance; and many men void of all true Wisdome, did for gaine or honors sake, make profession thereof, terming themselves *Sophous* and *Sophistas*, that is to say, Wise Men or Sages: *Pythagoras*, both to avoid the Arrogance of that Title (for God alone is truly wise) and to distinguish himself from such men as were wise only in Name, also to declare that Wisdom is no common thing nor within the reach of every Man; was the first that changed this Name, refusing to be called *Sophos*, that is to say a Wiseman or Sage, and choosing in stead thereof the Title of *Philosophos*, a Phylosopher, or Lover of Wisedom; as we find it recorded by *Cicero* in the first Book of his *Tusculans* Questions, and by *Plutarch* in his Third Book of the Opinions of Phylosophers, Chap. 3. *The terme Phylosophy whence derived.*

The Novelty of this modest Title was so pleasing to learned Men of all Sects, that they chose all by common consent to be called Phylosophers, Lovers of Wisedom, rather then *Sophoi* or *Sophistai*, Wisemen or Sages. So that, if we consider the Original of the word, *Sapientia* and *Phylosophia*, Wisedom and Phylosophy, are of one and the same import.

Howbeit, The Word *Sapientia*, is commonly taken in a more strickt sence, so as to signifie the Metaphysicks, as being reputed the most sublime and excellent of all Theoretick Sciences and consequently termed *Prote Sophia*, the principal part of Wisedom, and *Prote Phylosophia*, the most excellent Phylosophy. Whereas on the contrary side, the same word *Sapientia* or Wisedom is used in a larger sence by *Aristotle* in the sixth Book of his *Ethicks* written to *Nichomachus*, Chapter, 7. where it is attributed unto Artificers and *Phydias* a carver in stone and *Polycletus* a maker of Statues, are termed *Sapientes* or wise Men.

But as the word Phylosophy is sufficiently known to all men; so are there very few that understand the true definition of the thing it self. For those main Definitions thereof, which go up and down among learned Men, are rather descriptions and *Encomiums*, then right Definitions. *Plato* describing the same in his *Dialogue* termed *Phædo*, calls it *The contemplation of Death*. For, there being a twofold kind of Death, the one natural, which is a Separation of the Soul and Body; and the other such a Death as whereby the Soul continuing in the Body, is weaned from Earthly things, abandons vitious desires, and gives it self wholly up to the Contemplation of the most Excellent Objects: and seeing Phylosophy teacheth, this same Abstraction and Separation of the Soul from the Body, which is as it were the Prison thereof, and the Garment of Ignorance, whereby it is clouded; therefore *Plato* *Plato his Definition of Phylosophy.*

(though Metaphorically and therefore not so fitly) defines it to be, *The Meditation of Death.* In the same sence, it is said to be *The Separation of the soul from the Body, And Affectation of Death,* and a *Customary course of Dying daily.* And the same *Plato* in his Dialogue termed *Theætetus* saies that *Phylosophy, is to study as much as may be to be like God.* For the Operations of God being of two kinds, *Viz.* The knowledg of all things, and that Action whereby he Rules and Disposes all: Phylosophy makes a man capable of both these as far as human Nature is capable. For she both teaches us to contemplate all things, and to guide our Actions by the Rules of Honor and Honesty.

Cicero his Definition. That also is a common Definition of Philosophy which was used by the *Stoicks* and by *Tully* in the Second Book of his Offices, Viz. That *Philosophy is the knowledg of all things divine and human.* By human things understanding all things corporeal and subject to our sences; and by things divine, meaning all such things as being incorporeal are not subject to our senses, but perceptible only by the understanding. Or by the term human, such things may be understood, as tend to the Preservation and Progagation of this mortal life and civil society of mankind; and by the term divine such sublime matters as transcend vulgar Capacities.

Aristotles Definition. There are also certain definitions of Phylosophy extant in the writings of *Aristotle*, as where in the first Book of his *Metaphysicks*, Chap. 1. he saies, it is the *Science of Truth*; and in another place (though this seems to be intended by him, as a definition of *Metaphysicks* only) he saies that, *Phylosophy is the knowledg of all things that are, not particularly, but generally considered.*

Phylosophy cannot be exactly defined. Nevertheless, as we said before, these are not right definitions, but either *Encomiums* or *Laudatory Elogies*, or Tolerable descriptions, not containing the true kind nor the difference of the thing defined. Yea and the very truth is Phylosophy cannot be exactly defined because it is not *Genus Univocum*, and has a nature distinct from its parts. Neither is it *Homonymal* (for the parts thereof agree more then barely in name) but such an one as they term *Ab uno ad unum.* For we must not think that Phylosophy is some one science conversant about some peculiar sort of being: but that it is the totall kind, comprehending all the Sciences in the world. For all things cannot be known by one habit of the mind, but by divers: which when they are all conjoyned, they make that perfection of knowledg, which is called Phylosophy. And therefore all the definitions of Phylosophy which are usually brought, do swerve from the perfect Law of a Definition.

Its Definition. Howbeit from what has been already said, we may collect this following description: *Phylosophy is an Habit of the Understanding, consisting in Wisdom and Prudence, as that which contemplates all things, and so guides the actions of a Man, as that he may attain the Summum bonum, or cheif Felicity of which he is in this Life capable.* For seeing a Man is perfected by Phylosophy, and thereby qualified, it must needs be a certain quality or accidental form, by which a man is made fit to perform all the actions and Duties belonging to the human Nature. And it is such a kind of quality as is not born with us (for no man is borne a Phylosopher) but attained, being no other then an habitual ability, not of the body (for it is not the body of a man but his mind which wants perfection) but of the understanding. And therefore Phylosophy is defined to be a twofold Habit of the understanding, viz. Wisdom and Prudence, under which terms Intellection and science are comprehended.

The Division of Phylosophy according to the Stoicks. We are now to consider how Phylosophy ought to be divided into its parts; which is a thing wherein Authors are not agreed. The Stoicks have divided Phylosophy, into natural, moral and rational; under natural Phylosophy, taking the phrase in a large sence, they comprehend not only Physica or the Doctrine of Nature, properly so called, but also Metaphysicks and Mathematicks: by moral Phylosophy they understand that Doctrine which regulates the manners and actions of men; and by rational Phylosophy or Logick that which teaches us how to reason, argue, and find out the truth. And the truth of this division, they thus endeavor to prove. Seeing the happiness of a man, which Phylosophy aims at, does consist partly in the actions of virtue, and partly in the contemplation of truth, hence two parts of Phylosophy arise; the one of which instructs our Manners and actions according to the Rules of virtue, and is termed Moral Phylosophy; the other is busied in the inquisition of truth and hunting out the secret mysteries of Nature, and is termed Physica, or natural Phylosophy. And because in the search of Truth, we are very apt to mistake, a third part is necessary, to teach us the way and method of reasoning; which from *Logos*, reason, is called Logick, Logick, or the Art of Reasoning.

But

But this Division of Phylosophy, is by very many and those very learned interpreters of the peripatetick Phylosophy, rejected, both because the word Physica is therein improperly used, and because it makes Logick a part of Phylosophy. For the intent of Phylosophers was, to include in this division such disciplines, as treat about some real kind of being, the knowledg whereof denominates a man to be wise or a Phylosopher, and Logick is no such Discipline. For the Reasons of things are not the subject thereof, because compared to that which truly is, they have some sort of beeing; for in this respect they belong to Metaphysicks; nor because, or in as much as they are framed by the mind of man, for so they belong to natural Phylosophy; but only as instruments, profitable to denote our first conceptions, and such things as truly are. And therefore Logick is not a part of Phylosophy, but the instrument of a Phylosopher, to guide his understanding, being invented not for its own sake, but for the better understanding of all other sciences. Which Aristotle confirmes in the first Book of his Topicks Chap. 9. Where he calls it the Handmaid of Phylosophy, yet my intent is not contentiously to wrangle with any man that shal be of the opinion of *Pererius* in the second Book of his Natural Phylosophy, Chap. 18. viz. That when it is disputed whether Logick be a Science or a part of Phylosophy, the Controversie is rather touching words and the manner of Expression, then the thing it self; some taking the words Phylosophy and Science, in a larger, others in a more press and proper signification.

The same refuted.

whether Logick is a part of Phylosophy

Toletus divided Phylosophy into three parts. Speculative, Active and Factive: taking the ground of his division from that Ignorance which Phylosophy cures in us, which is threefold, either of the Truth, and that part which heales this, teaching us to find out the truth, is called Speculative or contemplative Phylosophy; or it is Ignorance how to act and play our parts upon the stage of this world, and that which cures this, teaching us to conform our Actions to the Rule of right Reason, is called Active Phylosophy; or finally it is the Ignorance of things necessary to maintain and preserve our Lives, and that is healed by the Factive part of Phylosophy, under which is comprehended all curious mechanical Artifices. But, though this division be true in respect of the principal disciplins: yet is it no good division of Phylosophy. For, the *Factive* Disciplines are not to be reckoned as a part of Phylosophy; For, they do neither contemplate things divine; nor do they regulate these actions which are proper to a Man; nor is honesty the thing they aime at, but Profit, nor does the chief good and Felicity of a man consist in them. And who is there that dares reckon Smiths, Carpenters, Joyners, Weavers and such like Artificers, amongst Phylosophers? For they are only the Servants of civil Policy. And therefore Lucian justly derides those, which reckon Arts mechanical as a part of Phylosophy, when speaking of one that was about to dig up a Feild, he saies, that with his Spade he would play the Phylosopher.

The division of Tolet.

The said division refuted.

It is therefore to be observed, that the name of discipline is of larger Extent then that of Phylosophy, and that all Disciplines are not comprehended under the Notion of Phylosophy. Yet has Phylosophy obtained this peculiar dignity, that all disciplines are either a part thereof, or fruits growing and resulting there from; or an instrument provided and fitted for its Service.

The name of discipline larger then of Phylosophy

I, for my part, take that to be the truest division of Phylosophy, which is delivered by *Aristotle* in the Second Book of his *Metaphysicks*, Chap. 1. and retained by all sorts of interpreters, viz. into Speculative and Practical. The Speculative part, is that which contemplates all beings or things, with their Principles and Affections or Qualifications, only for knowledg and truths sake: But the practical part of Phylosophy is that whose subject is the Actions of Men, which it regulates according to the Rule of right reason and Honesty; and does therefore teach us not only to know but to do also. For seeing the mind which Phylosophy is to inform and frame, has two parts, the Intellective or understanding part, and the Appetitive or desiring part, they make a double end, and it makes two parts of Phylosophy; the Speculative, which perfects the knowing or Intellective part of the Soul or mind, and the practical, which moderates the Appetitive part of the mind, and regulates our affections. So that the Duties of a wise man are two, to contemplate all things that are, and to performe such actions as are best, and most suitable to the Life of a man. Or more briefly, to contemplate things divine and regulate human affairs. For, after that (to use the words of *Marsilius Ficinus* in the fourth Book of his Epistles) the Mind of a Phylosopher, has contemplated what is the first good or goodness it self, judging in human affaires, what things are good & what bad what filthy and unseemly, and what honest & comely; what profitable, and what unprofitable: according to the pattern thereof he disposes the affairs of men; draws them from that which

Aristotle his division.

The same confirmed first from the subject

is evil, and by this prudence of governing, he rules his own private Family, and the common-wealth, and teaches the lawes and waies of the Administration thereof. Nor was this division unknown to the Platonicks, For these are the two wings wherewith the mind of man flies up to Heaven, from whence being weighed down with Earthly Cogitations, it had before fallen: concerning which see *Plato* in his Dialogues cald *Phædo* and *Phædrus*, and *Marsilius Ficinus* in the first Book of his Epistles Page, 612.

Secondly the from Object. The Verity of the said division is further demonstrated, from the end and Object. But most immediatly from its end: howbeit distinct Objects do produce distinct ends. For seeing every discipline is conversant about some one thing or other: and there are two kinds of things, as is apparent in *Aristotle* his sixth Book of Ethicks to *Nicomachus*, Chap. 3. Some things being necessary, others contingent, and of those which are necessary, some are simply eternal, ungenerated and uncorrupted; others necessarily made, which though they are not alwaies but are made; yet are they not produced by us; but by nature, working by certaine causes: Now the contingent are such things as may or may not be, and whose principle is in the doer and not in the thing done, which depend upon our will, in the power whereof it is, to effect them or not. Hence we gather, there are two parts of Phylosophy, one which is busied about the things necessary, and the other about things contingent.

Two kinds Of things.

Thirdly from the end. And this distinction of things, does also produce divers Ends. For either we handle a matter, only that we may know it, or that besides the knowledg we may effect the same: a third cannot be assigned. For the things which alwaies are or which are made, but by Nature and not by our selves, we therefore handle, that we may know their nature. For what was ever so made, as to endeavor to effect such things as are only possible for Nature, but impossible for all the Men in the world to effect? But those things which are not alwaies, and may be effected by us, we do not handle only to know them, but that their Nature being discovered we may learn to effect them. And therefore those former disciplines, which are conversant about things, not for any operation, but for knowledg sake alone, are rightly termed speculative sciences, or sciences absolutely and properly so called. But the other disciplines, which are verst in contingent things, or such things as are subject to our will, are called disciplines or sciences (the word science improperly taken) practical and operative.

Object, 1. Nor let any Man here object, that al Sciences and all arts do contemplate and speculate one thing or another, and direct us to the effecting somwhat or other, as Natural Phylosophy leads us to natural magick, the Art of healing Diseases &c. And in Geometry there are many Theorems which teach us to do somwhat, as to Raise a perpendicular upon a right line given. For al Sciences, absolutely, and in respect to their end are contemplative, and respect no action: but the other disciplines, though they are busied also in the knowledg of things: yet they do not subsist therein, but such as are active do thereby govern their actions, and the Factive have only their work made, for their end. Nor does Geometry consider those Theoremes that it may effect any thing; but only that it may contemplate the affections of its subject, and find out the Truth: But the disciplines subject thereunto, do afterwards make use of the said Theoremes, to effect somewhat, Which when they do, they pass the bounds of the higher sciences, as may be seen in Agriculture or Husbandry, and others.

Answer.

Object, 2. Nor let that trouble us which some say, viz. That Contemplation and Action are so nearly combined, that one cannot be separated from the other. And that therefore no true difference can be assigned in this respect, seeing Contemplation it self is an action, and that therefore the sciences while they teach us to speculate, teach us to Act. For every energy or Operation of a Man is not termed Praxis in this Case, but such as is subject to the command of the will, and seeing many Errors may happen there abouts, it needs a certain habit, which being inherent in the practical understanding, should be its rule as it were in acting. Now those Actions which are subject to the will are threefold. One proceeds from the will it self, as Election or choice; a second proceeds indeed from another power, yet is under the command of the will as the Operations of the wrathful and lustful faculties of the Soul: and and touchin; this we cheifly speak in this place. The third of it self, is not subject to the will, but in some respect, as the operations of the speculative understanding,

Answer what Praxis is.

Three sorts of actions subject to the will.

are

are so far subject to the will, as they are performed at this time, and so long or so long, or according to other Circumstances. These therefore, as the former, seeing they are not simply subject to our will, do also not pertaine to this place. We may therefore well grant, that contemplation is an action, that is an act according to the inward energy or operation of the Mind: but no external act, such as that is, in respect whereto, one part of Phylosophy is said to speculate, another to act. For this internal action is no way different from the knowledg of the truth, as in practical Disciplines whose action differs from the knowledg of Truth, and whose end does not rest in the truth known, but besides that, proceeds to work somewhat.

And seeing as has been said before that Phylosophy has more then one single signification; it is to be marked, that this name is attributed principally and primarily to the Speculative part, and consequently and in the second place to the Practical. For they are commonly termed Phylosophers, who apply themselves to the Sciences; and who profess themselves skilful to govern the life of man.

The subdivision of speculative Phylosophy

And this is the general division of Phylosophy: afterwards each part is subdivided. *Aristotle* in the sixth Book of his Metaphysicks Chap. 1. Divides the speculative part of Phylosophy into *Physica*, *Mathematica*, and *Metaphysica*. Which division truly, was both received by the Ancients, and is this day in use, and has its reasons to support it. For since the diversity of Objects breeds a Distinction of sciences, it is manifest that there are no more nor fewer sciences, then the three aforesaid. For a being is considered two waies, Universally and Particularly. That Science which considers the whole and Universal state of Beings as beings, is Metaphysica. The other Sciences consider a being in Particular, and some sort of being. And these are two, as there is a twofold sort of beings. The one is in matter and cannot be known without matter, and this Physica considers: The other is indeed in matter, but it may be separated therefrom by our thought, and may be known distinct from the matter, which is handled by *Mathematica*. And therefore *Metaphysica* considers a being, only as it is a being: *Physica*, considers it as it is moveable or natural: *Mathematica* as it is abstracted from Matter. But, as *Pererius* in the first Book of his *Physica*, Chap. 7. Rightly saies it would not be absurd, if a Man should add a fourth Science, which should treat of spirits and substances separated from matter, which some at this day term *Pneumatica*. Yea it were no Absurdity to add a fift, which should treat of such things as might be naturally known concerning God.

The same demonstrated.

Pneumatica.

Mathematical disciplines divided into pure and mixt.

Again there are several sorts of Mathematical disciplines. For their subject is Quantity; which being double continual and discrete, there wil also be two Sciences purely Mathematical, Arithmetick and Geometry. Musick is subordinate to Arithmetick, from whence it borrows its principles, and considers Number as it is joyned with sound. This according to *Aristotle* in his first Posteriora is two fold, Mathematical and aconstick; but the former is truly and properly a Science, the Latter is rather to be termed an Art. Stereometria which considers the Doctrine of solid bodies is a part of Geometry. Nor is it subordinat to Geometry, because it does not consider Quantity with any Contraction, and addition of matter and sensible quality; nor is it of a middle Nature between *Physica* and Geometria: but purely Mathematical; seeing it quite separates its subject from sensible matter. To Geometry, Perspective is subalternate or subordinate, which considers a line as it is visible: Now Geometry and Stereometry do bring forth Sundry disciplines, which are in some sort of a middle Nature betwixt Mathematical and Physical: yet are they called Mathematical, becaus they use Mathematical principles, and considers all their subjects in relation to quantity. Such are: The Doctrine of the Raine-bowe, Astronomy, Cosmography, Geography, Chorography, Topography. Thence also afterward sundry Mechanical Arts do arise.

The subdivision of Practical Phylosophy

The other part of Phylosophy was the Practical. But Praxis taken in a large sense, comprehends under it *Poiesis* and *Praxis*, properly so called. Now *Praxis* or Action differs from *Poiesis* or working, according to *Aristotle* in the *sixth of his Ethicks to Nicomachus Chap. 4. and the first Book of his Magna Moralia Chap. 35.* In that Action does leave no Work behind it: but Working or *Poiesis* is such an Operation as leaves a work behind it. From this twofold signification of the word Practice, two kinds of disciplines arise, Active disciplines, and Facting disciplines. The factive are the Arts, as was said before, and do not belong to Phylosophy. But

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the active part of Phyloſophy is divided into *Ethica*, *Politica* and *Oeconomica*.

The utility and neceſſity of Phyloſophy. As to the Utilety of Phyloſophy, though that be cheifly to be regarded in the Practical part: yet has the ſpeculative alſo its profit, of which we read much every where in Authors. Two Teſtimonies ſhall ſuffice in this place. The firſt is that of *Hermes Triſmegiſtus* in his Book Entitled, *Of Piety and Phyloſophy*. *He that is pious and Godly is an exact Phyloſopher. For without Phyloſophy it is impoſſible to be perfectly religious. But he which knowes the things that are, and how they are ordered, and by whom, and for whom: he will give thanks to the cheife workmaſter, as to a good Father, a loving Nurſe and a faithful Steward: And he that gives thanks is Godly; and he that is Godly and Pious, ſhall know, both where the truth is, and what it is, and the more he learnes, the more godly will he grow.* The Second is that of *Scaliger*, in his 307. Exercitation *Sect.* 3. *The Searching into theſe ſubtilities, although it be not profitable to make Windmils or watermils to grind Corn; Yet it ſcoureth off the ruſt of Ignorance from our Minds and whets and prepares it to the knowledg of other things; in a word fills it with ſo much ſplendor, that it can light it ſelf to gain the ſimilitude of the firſt workmaſter: who as he is fully and perfectly all things, and beſides and above all things: ſo he will have thoſe to be his, that are ſtudious of the Sciences; and has made their underſtanding, Lord of all things.*

The pleaſure of Phyloſophy Finally, How great the pleaſure is which ariſes from the knowledg of Phyloſophy and cheifly the Speculative part thereof, *Ariſtotle* teaches in his firſt Book *de Partib. Animal.* Chap. 5. I ſhall here ſet down what *Cæbius Rhodiginus*, *in the ſeventh Book and Chap.* 30. *of his Antiquæ Lectiones*, Cites out of *Maximus Tyrius*. *You know*, ſaith he, *what it is that I think the Speculation of a Phyloſopher does moſt reſemble?* Viz. *A manifeſt, clear and flying dream. For his Body remaining ſafe and ſound, his mind runs al the world over; it is carryed from Earth to Heaven; it paſſes over the whole Ocean Sea; it flyes through the whole Aire; with the Sun it compaſſes the Earth, with the Moon it walkes the round; it joynes it ſelf to the dance of the other ſtars, and comes little ſhort of bearing a ſhare with Jove himſelf, in the Mannagement of all things: O Happy Pilgrimage! O Beautyful ſhewes! O moſt true and real Dreams!*

Chap. 2. *Of the Nature of* Phyſica, *or Natural Phyloſophy.*

SEing we are to treat of Natural things, it is altogether requiſite, that we declare in the firſt place what Diſcipline that is which treates of Natural things, which we cannot do more conveniently then by enquiring into the kind and ſubject (from whence the difference in definition of Sciences is taken) of *Phyſica*, or Natural Phyloſophy.

The Genus or kind of Natural Phyloſophy As to its kind, though ſome do ill in confounding Art and Science; yet all true Phyloſophers and Peripateticks are agreed, that *Phyſica* or Phyloſophy natural, is a Science: ſince the definition of a ſcience does properly agree thereto. For it demonſtrates in a neceſſary ſubject the proper affections by the proper Cauſes: as very many demonſtrations touching things natural, do witneſs. And ſo alſo it is called by *Ariſtotle*, *in the Third of his Phyſicks, Chap.* 4. *Text*, 24. *and the Second of his Metaphyſicks, Chap.* 3. *Text the Third*, and the ſame is by him plainly proved, *in the Fourth of his Metaphyſicks, Chap.* 5. *Text the* 23. And although it be reported that of old, *Heraclitus*, *Cratilus*, and *Pythagoras*, held there was no knowledg of natural things, but only opinion; and *Socrates* being diſcouraged by the Mutability of natural things, and becauſe he thought he had no certain knowledg of them leaving the ſame, gave himſelf wholly to moral Phyloſophy; Alſo *Democritus* complained of the deep pit of truth which had no bottom, and Empedocles of the narrow paſſages of the ſenſes: yet it ſeemes moſt probable that theſe Phyloſophers did not deny all knowledg, but rather modeſtly diſſembled their own knowledg, then confeſſed their Ignorance; ſeeing what we know in compariſon to what we know not, is little more then nothing; and taxed their Arrogance who did vainly boaſt of their own Wiſdome. And as for the new Sect of *Academicks* who did not only deny that there was any knowledg of things natural, but that there was any knowledg of any thing, they are elſe where refuted. Nor let that trouble us, becauſe in natural Phyloſophy many times probable Reaſons are invented. For theſe take not

Whether it be the knowledg of Natural things.

away

away from the neceſſity of the Sciences truth, but do often prepare and fence the way to following demonſtrations, or are uſed to declare the principles.

We muſt therefore hold that *Phyſica* or Natural Phyloſophy is a ſcience and that properly ſo called, viz. A ſpeculative ſcience, as appears out of *the ſixth of* Ariſtotles *Metaphyſicks Chap.* 4. And out of *the firſt of Metaphyſicks Chap.* 6. Although it be in a manner ſuperfluous to ad the term ſpeculative, ſeeing if we take the word Science properly, all Sciences are ſpeculative: now words are not to be improperly uſed in Definitions.

Natural Phyloſophy has two ſorts of propoſitions.

Now as concerning the neceſſary truth of *Phyſica* or Natural Phyloſophy, we muſt obſerve, that there are in this Science two ſorts of Propoſitions; ſome are alwaies and ſimply neceſſary, as the fire burnes: the knowledg whereof is moſt properly called Science: others are neceſſary for the moſt part, concerning ſuch things, as are in their ſubject, only in a certaine ſtate, or for the moſt part, and when all impediments are removed; as a Man is born in the ninth Month, with two hands, two Eyes, two Kidneys. For theſe diſpoſitions are of a middle Nature betwixt contingent and neceſſary, and therefore ſome do call them neceſſary, by a Phyſical or natural Neceſſity.

The ſubject thereof.

Now before we ſpeak of the ſubject of *Phyſick* or Natural Phyloſophy, ſome things are to be premiſed concerning the word ſubject. For this word has ſundry ſignifications. 1. A ſubject is that wherein there are accidents. 2. A ſubject is that part of a propoſition of which ſomwhat is affirmed. 3. The matter is termed a ſubject in reſpect of its forme. 4. A thing is ſaid to be a ſubject in reſpect of ſome Action and Operation; and it is that about which the Artiſt or workman is employed and whereupon he exerciſes his Labor. 5. That is termed a ſubject, which is handled in any Science. Now it is ſo called, becauſe it is ſubjected to ſuch accidents and affections as are demonſtrated therein, as alſo becauſe our knowledg is converſant thereabout. And in this laſt acceptation, we do here take the word ſubject: in which ſence nevertheleſs, it is taken divers waies. For firſt in a more large ſignification, all that is termed ſubject, whereof we treat in any Science, whether it be a principle, an affection and accident, or any other thing. But properly that thing or matter which is therein conſidered is called the ſubject of a Science, which ſubject has theſe Properties. Firſt, That we know that it is in Nature alwaies and neceſſarily, and what the name thereof ſignifies. And therefore the ſubject is never demonſtrated in its proper Science. For ſeeing it is the Baſis and Foundation of all things delivered in the Science, if that ſhal be called into Queſtion, denied, and taken away, all things that are ſaid thereof, are denied and taken away. The Second condition is, that it have proper affections or diſpoſitions, and proper principles, of all which it is the Baſis and Foundation. And therefore a ſubject, in that Science wherein it is a ſubject, is not conſidered as inherent in any other thing; and every thing that is conſidered in any Science, as being inherent in ſome other thing, is not the ſubject of that Science. The third is, that it be adæquate or commenſurate to the whole Science, and not wider or narrower then it, and that all things which are delivered in the Science, do pertain to the Explication thereof. Of a ſubject thus conſidered there are two parts: one is as it were the matter, and is termed the thing conſidered; the other is in ſtead of the form, and is termed the manner of conſidering. The thing conſidered, may be common to many diſciplines: but the manner of conſidering, which contracts the thing to a certain and peculiar way of conſideration, is proper to every Science, and thereupon properly depends the diſtinction of Sciences.

The terme ſubject how many waies uſed?

How underſtood in the place?

The properties of the ſubject of a ſcience

Two parts thereof.

The divers opinions of Phyloſophers about the ſubject of Natural Phyloſophy

Touching this Adæquate ſubject of Natural Phyloſophy, there is ſome difference amongſt authors, moſt of the Greek Interpreters of *Ariſtotle*, do make the ſubject of this Science to be *Corpus Naturale*, a Natural Body; *Thomas Aquinas* ſaies it is *Ens Mobile*, a Moveable being; *Albertus* and *Ægidius* ſay it is *Corpus Mobile*, a moveable Body; *Scotus* wil have it to be, a Natural ſubſtance; *Tolet* makes it, a Natural Being; others ſay it is Nature, by nature underſtanding God and Angels and al Bodies, others again wil have it to be nature, meaning thereby al things pertaining to natural Bodies ſuch asare not only the compound bodies themſelves, but alſo their principles and affections or diſpoſitions: others ſay it is *Ens Mobile*, a moveable being, not only, as *Thomas Aquinas*, underſtanding thereby, a moveable Body, but alſo the matter

and

and forme: others will have it to be *Corpus Naturale Miſtum*, a mixt natural Body: others, a Body ſubject to generation and corruption.

The true opinion. It is not worth the while to produce in this place, all the Arguments that are brought to juſtifie theſe ſeveral opinions. I approve only of the firſt opinion, which ſaies the ſubject of this Science, is a natural Body. To this opinion (as ſhall be ſaid hereafter) I conceive the four following may be reduced; and moſt learned men conceive that the ſtrife is more about words then the thing it ſelf, and that herein lies the controverſie, how the ſubject of this Science, the thing it ſelf being agreed upon, ſhould be called: whether a Natural Body, a moveable being, a Natural ſubſtance, a Natural being: and therefore theſe other opinions are to be reduced to the firſt, or are ſimply to be rejected, as the latter five.

The adæquate ſubject of Phyſick. The adæquate ſubject therefore of Natural Phyloſophy is a natural Body, in as much as it has in it Nature, that is to ſay a principle of motion and reſt. For Natural is taken three waies. Firſt, For that which is eſſential to any thing, and belongs to the very eſſence or being thereof: Secondly, For every thing which concernes the knowledg of Nature; in which ſenſe, both the firſt matter and form and accidents of a Natural Body, are termed Natural: Thirdly, And properly it is taken for that which has Nature in it, that is to ſay, a certain internal principle of motion and reſt; and ſo neither motion, nor matter is termed Natural, but only Bodies compounded of matter and forme. And ſeeing the Adæquate ſubject of a Science, as was ſaid before, conſiſts in the thing conſidered, and the manner of conſidering the ſame: the thing conſidered in this Science, is a body, and the manner of conſidering is, in as much as it has Nature in it, that is to ſay. A principle of motion and Reſt. For although every Body has in it a principle of motion, and that which has in it a principle of motion is a body; yet in as much as a body may be conſidered, not only as it has in it a principle of motion, but in divers other reſpects: by this conſideration, Natural Phyloſophy is diſtinguiſhed from other diſciplines, which do alſo treat of a Body.

Natural, how many waies underſtood?

Confirmation of the Opinion propounded. And that what has been ſaid touching the ſubject of this Science, is true, may hence appear: in that all the porprieties of the ſubject of a Science do agree hereunto. For it is fore known what it is, and what the name thereof ſignifies, it has its proper principles matter and form; its proper affections as motion, place, time &c. nor is it in this Science, inhærent in any other thing, and it is Adæquate or commenſurate to the whole Science. For all things delivered in Natural Phyloſophy, are either the principles of a natural Body, or its affections, or its kinds and ſorts. The ſame alſo is apparent from *Ariſtotle*. For as to the thing conſidered in this Science. that it is truly ſaid to be a Body, appears from the *Begining of his Second Book of Phyſicks, and his 3. de Cælo Chap. 1. and his firſt de Cælo*: Where he tels us that the Science of Nature is converſant about Bodies, and that it conſiders their principles and affections.

And that the manner of conſidering is, in as much as the ſame Body has nature in it, is apparent from the begining of his Second Book of Phyſicks. For ſeeing all things are diſtinguiſhed from other, by their form; and things natural differ from artificial and non-natural things, becauſe they have the principle of their motion in themſelves, but the other only by accident: doubtleſs, to have in it ſelf a principle of motion, is in ſtead of the form, and the formal reaſon of the ſubject, whereby a Body, the thing conſidered in Natural Phyloſophy, is differenced from all other things. The ſame is confirmed by *Ariſtotle*, in the Second Book of his Phyſicks, *Chap. 7. Text* 70. or 71. Where he ſaies: *What ever things move being themſelves moved, do belong to the conſideration of Natural Phyloſophy &c.* For he teaches, that thoſe things only are conſidered by a Natural Phyloſopher, as his ſubject, which have in themſelves a principle of motion. Howbeit, other things may alſo be conſidered in natural Phyloſophy, which have not in them a principle of motion, but it is as they are principles or Accidents to bodies Natural, but not as the proper ſubject of the Science of Nature. Which is manifeſt from the 73. *of the ſame Book*, where he ſaies, that there are ſome principles Phyſically moving, but not Phyſical; that is to ſay not conſidered as the ſubject of *Phyſica* or natural Phyloſophy, becauſe they have not in themſeles a principle of motion. And this is the true Opinion concerning the ſubject of this Science, to which, as was ſaid, the following four

The Differing opinions Reconciled.

Opinions

Opinions must be reduced, or rejected. For seeing these Opinions contain two manner of considering the subject, the one, as it is moveable; the other, as it is Natural: both of them do signifie, indeed, nothing else, but Nature having in it a principle of motion. For since moveable, may be taken two waies, as for that which hath an aptitude to motion, which is a certain affection of a natural thing; or for that which hath Nature in it, that is matter and forme, or the Principle from whence such aptitude arises: moveable cannot be taken here in the former sense, but only in the latter. Because the passion of a subject cannot be its *Ratio Formalis*, or formal Constitutive consideration; and with its subject it makes a thing which is accidentally one, and is later then its subject, of which it may also be demonstrated. Hence therefore would follow this Absurdity, that the subject, *viz.* A thing moveable, should in its proper Science, be demonstrated by its proper Cause, *viz.* Nature. And therefore, *Moveable* cannot be taken for a passion, but for the reason and essential degree of a Body, from which of it self motion arises. In sense it denotes nothing else, but natural, or that which hath Nature in it. Howbeit, if we shal accurately weigh the matter, the manner of considering is better and righter described by the term Natural, or that which hath Nature, then by the word Moveable. For seeing *Natural* includes both motion and rest, and *Moveable* only motion; the former is commensurate, the latter not. And therefore either we must take *Moveable* for Natural, and that which hath Nature, or we must reject it as less Proper and not commensurate. Since from all which hath been said it appears, that *Natural*, or *in as much as it hath Nature in it*, is the true manner of considering the subject of this Science, therefore by all means we must make the thing considered to be equal thereunto. But if we shal consider all things which are placed in the Predicament of substance, we shall find nothing but *Body* equal thereunto. For what ever hath in it a principle of motion is a Body, And therefore it must needs be, that both Ends or Being, and substance, are taken for a Body, But a Body in as much as it hath Nature in it, is more properly said to be the subject of natural Philosophy, because to have Nature is accidental to *Substance*, and to *Being*, unless they be taken in a prickt sense for a Body. Nor is there such a proportion betwixt *Substance*, *Being*, and *Natural*, as ought of necessity to be, betwixt the thing considered and the manner of consideration. For *A Being* is not said to be Moveable, as it is a *Being*; for so every Being should be Moveable.

Moveable understood two waies.

And if there be any that will not allow their opinion to be thus corrected, and wil endeavor to obtrude upon us, somwhat more common, or more narrow, for the subject of natural Physosophy, they are justly to be reproved. For those that wil have God himself, the Intelligences, and Angels, to be handled in Natural Physosophy, as the subject thereof: truly they do absurdly and unskilfully confound things abstract and simple with bodily things and such as are overwhelmed in matter. For seeing these things are exceedingly different, how can any man assign to them one manner of consideration, which is the thing which makes a Science to be one?

Nor do those men think aright, who make Nature the subject of natural Physosophy; understanding, thereby, both the principles, and affections, and Compounds. For they do not rightly use, neither the word *Subject* nor the word *Nature*. For a subject properly so called, whereof we discourse in this place, is not taken so every thing that is handled in a Science, but for that whose conditions are such, as have been set down before, and which is distinguished from the Principles and Affections. Again, they do ill in confounding *Nature* and *a thing Natural*; which they might easily learn, out of *Aristotles* second Book of Physicks *Chap.* 1. where the Physosopher shews us, how *Nature*, *Natural* and *according to Nature*, differ one from another.

Also we approve not their opinion, who conceive that *Ens Mobile* a *Moveable Being* is to be counted the subject of this Science; and by *Mobile* they understand also the matter and the form. For nothing is called moveable, but that which is the subject of motion: and nothing hath in it a principle of motion but a Body. For matter is not moved of it self, but by accident, *viz.* In as much as, it is a part of that Body which is moved. But if so be whatever hath any relation to motion, should be called movable al things explained in this Science, will be several sorts of its subject, and therefore there will be no Principles, no Affections or adjuncts different therefrom.

And as we have rejected their opinion, who make ſomwhat more common then a Natural Body, to be the ſubject of this Science, ſo can we not agree to them, who wil have the ſubject thereof, to be ſomwhat more narrow. For ſome make the *thing conſidered* to be, a Natural Body tranſitory, or ſubject to mutation: others, a Natural Body mixt. Yet they agree in the manner of conſideration, which both make to be *in as much as it is Movable.* But they *both are* in an Error. As to the thing Conſidered; becauſe the former reject the Heavens; the latter both the Heaven and Elements, from being ſorts of the ſubject, and will allow them to be only Principles thereof. For things muſt be ſo handled and conſidered, as they are conſtituted by Nature, Seeing therefore the Heaven and Elements are ſo produced by Nature, as not only that they ſhould be the Principles of other things, but alſo, that as peculiar ſorts of Bodies, they might compleat the Univerſe: they are to be known and handled both waies. As we ſee *Ariſtotle* hath alſo done; who explained them after the former manner in his Book of Generation and corruption; after the latter in his Books touching the Heavens: in which Books, what ever is ſaid of the Heaven and Elements, is ſaid without any reſpect to mixt Bodies. As to the manner of conſidering, they are both out, in that they make it more large then the thing conſidered. For not only, things mixt and ſubject to mutation, but the Elements alſo are Movable, or have in themſelves a Principle of motion.

The definition of Natural Phyloſophy.

From all the Premiſes, let us at laſt infer; that, *Phyſica* or *Natural Phyloſophy, is the Science of Natural Bodies, or of ſuch as have Nature in them.* Whereof being now to treat, I ſhall chiefly follow that ſame Eagle-Ey'd Phyloſopher *Ariſtotle.* For he did ſo excel in this part of Phyloſophy, that, though ſome do make him inferior to *Plato* in matters divine, (which *Scaliger* nevertheleſs denies again and again in the 365. of his *Exercitations, Sect.* 3. Yet in this Science he will eaſily bear away the Bell. I will ſay nothing of the *Platoniſts,* I ſhal only relate what is reported of *Plato.* For he coming upon a time into his School, and *Ariſtotle* being not there, he cried out, *The Phyloſopher of Truth is abſent.* And another time when he was abſent, he ſaid, *The Mind is not come.* And amongſt the Peripateticks innumerable company of moſt Famous Men and every way moſt learned, Greeks, Arabians, and Latines have handed this Phyloſophy to Poſterity, and ſpent all their lives in explaining the ſame, and acknowledged it alone for the true Phyloſophy, and have judged it worthy of ſo much honor, as never any other Phyloſophers Phyſicks were thought worthy of. In the mean time, I would not detract from the diligence and Induſtry of others, nor would I cal any man from making a more diligent ſearch into the ſecrets of Nature. Thoſe who have gone before us (ſaith *Seneca*) have done much, but they have not done all. There is much work yet remaines, and much there will remain, and he that ſhall be born a thouſand Ages hence wil not want occaſion to add ſomwhat or other. But that Man will do it more eaſily, who, hath known theſe things aforehand: and it is eaſie to add to things invented.

Natural Phyloſophy divided into a common and proper part.

And that I may propound a Summarie of al Natural Phyloſophy, as in a table before your Eyes; you muſt know that *Ariſtotles* Interpreters have fitly divided all this Science into two parts; the former they call *common,* the latter *Proper.* In the firſt we are to treat of the kind it ſelf, *viz.* A Body Natural commonly taken. And of all things appertaining to a Natural Body ſo generally conſidered; which *Ariſtotle* handles in his 8 Books of Natural Phyloſophy cal'd *Peri Phyſices Acroaſews.* In the other, we are to treat of all the ſorts of Natural Bodies; which *Ariſtotle* does in all his other Books of Natural Phyloſophy. Nor is this diviſion without Reaſon.

A Natural body how many waies underſtood?

For, A Natural Body is taken three manner of waies. 1. Only for the common kind, in it ſelf conſidered, without any conſideration of the ſorts. 2. For a Collection only of the ſorts. 3. For both together. *viz.* Both for the common kind, and the Collection of al the ſpecies or ſorts Nor are Natural Bodies only to be conſidered, according to the Proper affections, but alſo according to the common. Nor muſt the common affections, of the kind be attributed to the ſorts, nor muſt ſuch things as are proper to the ſorts, be demonſtrated of the kind. A Body Natural therefore taken in the firſt ſenſe, is the ſubject of the common part; taken in the ſecond ſenſe, of the proper; and in the third, of the whol Science.

We muſt therefore in Natural Phyloſophy, treat in the firſt place of a Body Natural in general, and conſider its principles and common affections, which agree to al Natural Bodies, conſidered as ſuch. And ſeeing a Natural Body is twofold, Simple

and

and compound: we muſt firſt diſcourſe of a ſimple natural Body, and its ſorts, the Heaven and Elements, or of the world as it is a maſs of al ſimples. After the explication of ſimple bodies, muſt follow the Doctrine of a mixt body; and firſt in general, where its principles, viz. The four Elements and its general affections or adjuncts are to be explained. Here therefore we muſt treat of the Elements, and of their qualities, of Action, Mixture, Generation and corruption. Mixt bodies, ſeeing they are twofold, perfectly and imperfectly mixed: in the firſt place we conſider things imperfectly mixed; and then ſuch as are perfectly mixed. And ſeeing things perfectly mixed are either ſimilar or diſſimilar: firſt we muſt treat of a body Homogeneal, perfectly mixed; which is handled by *Ariſtotle* in the fourth of his Meteors. Afterwards the ſeveral ſorts hereof are to be explained, as things dug out of the Ground, Mettals, and al the ſimilary parts which conſtitute Animals and plants. Here therefore we muſt treat of things dug out of the Earth and of Mettals. For other ſimilar mixt things, becauſe they exiſt not by themſelves in nature, but are therefore only, that they may conſtitute Animals and Plants, we muſt not treat of them in any other place, ſave where we diſcourſe of Plants and Living Creatures. And thus far may that part of Natural phyloſophy be extended, which treats of thoſe things which are common to things living, and things liveleſs. And the laſt place we muſt treat of ſuch things as concern only things living: and ſo the whole doctrine of natural Phyloſophy, ſhal end in the Explication of plants and Animals.

Chap. 3. *Of the Principles of Natural things.*

Whether a Principle and Cauſe do differ and how?

ALthough theſe two words *Principle* and *Cauſe*, are oftentimes confounded, yet they are found ſomwhat to differ amongſt Phyloſophers. For a principle is commonly of a larger extent then a cauſe. For al that is termed a *Principle* out of or from which at firſt any thing is, or is made or known; but that a thing may be a cauſe it is neceſſary that it receive its Eſſence therefrom, and depend thereupon. And thus every cauſe indeed, is a principle, but every Principle is not a cauſe. For the term from whence any man ſets upon the way, & the point whence a line flowes, are the Beginnings of a way and a Line, but not the cauſe. But paſſing over the ſundry ſignifications of a principle, let us now treat thereof, as it concurs to the conſtitution and generation of things Natural. In which ſenſe, Principles are by *Ariſtotle* thus defined: *Principles are ſuch things, as are neither made of other things, nor one of another, but all things are made of them.* And ſo there are *three* conditions of Phyſical Principles. *Firſt*, that they be not made of other things. For if they were made of others, they ſhould receive their Eſſence, from the principles of another Nature, and ſo themſelves ſhould not be principles. The *Second*, That they be not one made of another. For if one of them did conſtitute another and were a part of the ſame Eſſence, they ſhould neither be *Firſt* nor *Simple*. The *Third*, that all Natural things be made of them and receive their Eſſence from them.

The number of principles is three.

Now as concerning the number of *Principles* there were ſundry not only Opinions but Dreams alſo of the Ancients, which becauſe they are largly confuted by *Ariſtotle* in the *firſt of his Phyſicks*, and the moſt of them are now vaniſhed: Yea and ſome of them are not ſufficiently underſtood: I ſhal here paſs over all thoſe Opinions, and only undertake to explain that of *Ariſtotle*, as moſt agreeable to truth, who aſſerted only three principles of Natural things, *viz. Matter*, *Forme*, and *Privation*.

Yet this one thing I muſt premiſe, That while I eſtabliſh theſe three principles, I do not exclude that only firſt Principle of all things, *God*, eternal, immortal, only one and indiviſible, from whom and in whom are all things, but my enquiry is only after the firſt Natural principles of all things. For neither does *Ariſtotle* deny that all things have their dependance upon the moſt good and great God; as appears in the firſt Book of his *Metaphyſicks*, *Chap.* 2. Where thus he writes: *For God ſeems to be the Cauſe and principle as it were of all things.* And in the fifth Probleme of the thirtieth Section. *God hath given us two Organs within us, wherewith we make uſe of the Organs that are without: viz. To our Body the Hand, to our Soul, the Mind.*

Now being to ſearch out the number of Natural principles; we will take our beginning

beginning from hence, that *the principles of things are contrary one unto another*: which both all the ancients do seem to grant, and the thing it self argues as much. For those are called principles, which are neither made one of another, nor of any other thing, but all things are made of them. Now such things are prime contraries. For seeing they are first, they are not made of any other: and because they are contraries they are not made one of another, for one contrary cannot change into the substance of another thing which is contrary to it. *Moreover* experience it self does witness; that of all things that are, every thing does not act upon every thing, nor suffer from every thing, nor is every thing made of every thing, unless accidentally; but every thing acts upon its contrary, and suffers from its contrary, is made of its contrary, and dissolved into its contrary; or as *Galen* speaks in his *first Book of Temperaments, Chap.* 2. Every mutation is made by a contrary, and of a contrary, and into a contrary.

Seeing therefore the Principles of things are contrary, they must needs be more than one: for contraries are not one, nor can one thing be contrary to it self. 1 *Phys. Chap.* 6. *Text*, 50. Nor yet can they be infinite. For so should there be no knowledg of Natural things, which depends upon the knowledg of their Principles, and Nature it self abhors infinity. Moreover, since in every kind, there is one first contrariety; and of one contrariety, two extreams: consequently in a substance there are not infinite contrarieties, but those two first and extream are to be held for principles.

Wherefore two first contrary Principles are sufficient: one from which the departure is made, and which is the term from which the other, to which the Progress is made, or the term to which. Howbeit these contraries are not alone sufficient for the constitution of a thing. For as a contrary doth not make its contrary; so they alone of themselves cannot constitute a substance. For that contrary which is induced, cannot be received into that which is expelled; seeing contraries do mutually resist one another; and at the end of the motion, that contrary which is expelled, ceases to be. A third principle therefore of things must be added, which is contrary to neither of the other two, and which one while with one, may constitute one natural thing, another while with the other may constitute another, and which may be the subject of those contraries, by turnes. For seeing in every mutation a subject is required (for an accident cannot be without a subject) as *Aristotle* in *the first of his Physicks Chap.* 7. Proves by Induction; and which in the mutation of accidents, is most of all apparent, wherein we see there is a common subject of the accidental form abolished, and of that which is bred a new: and it is manifest that there is no progress from contrary to contrary, without some subject matter: the same is to be concluded touching that substantial mutation, which happens in a natural body.

And these three principles do suffice. For both one subject is enough to suffer: and two contraies to act. For one contrary can corrupt its contrary. The principles therefore are *Partly* contrary, which are called *Form* and *Privation*: and partly not contrary. For the subject which we call *Matter*, is apt to receive al forms. And they are all three necessary to Generation, which is nothing but a progress from the privation of one form in the matter, to the acquisition of a new form: yet every one after a peculiar manner, *viz.* The form as the *terminus ad quem*, the terme to which the motion is made; Privation, as the terme from which: the Matter, as the subject of the Mutation. Howbeit to the *Constitution* of a thing, two principles are only necessary *viz.* Matter and Form. For privation, besides that it is no substance seeing it is contrary to the form, it cannot consist therewith. Hence *Simplicius upon the first of Aristotles Physicks*, saies, To enquire after the Principles of natural things, is one thing, to enquire into the principles of mutation, is another; for of things natural Privation is an accidental Cause; but of Mutation it is a direct cause, or a cause by it self.

whether there be a Materia prima, or first matter.

These things being thus generally spoken touching the principles of natural things, let us proceed to handle them in particular. And as to the *first Matter*, although that there is such a thing in Nature, was before proved: yet let us prove it again, after this manner. Whatsoever is made, is either made simply of nothing, or of something. Not of nothing, for that is creation and not Generation; and therefore of something, now that of which a thing is generated, is either only form, or the whol compound,

compound, or somwhat besides these. Not the two former. For in the Generation of a new thing the former form perishes. There is therefore somwhat else remaining besides the form in that thing, out of which a new substance is generated, *viz* the matter, which hath a privation of the thing to be generated, and which is apt to receive as well that form which it now actually possesses, as that which, the former being abolished is introduced into its place. Now that this *is the first subject* and depends upon no other, is thus proved. Whatever things are changed, have a common subject. Al these sublunary things are changed one into another; if not al immediatly, yet mediately. For things mutually fight one against another, with contrary qualities, alter one another, and throw one another from their natural state and condition. Therefore they have al a common subject. For if it were of some other thing, it would not be subject to all mutations: and if it were not common, al things could not be changed.

The Doctrine of the first matter is obscure & exceeding hard to be known.

But what is the *Essence* of *Matter* is exceeding hard to find out, and can hardly be discerned by a direct knowledg. For as essential mutation, by which it is demonstrated, that there is matter, was known by way of analogy from accidental mutation; even so by analogy, and a certaine bastard kind of knowledg and inspection (as *Plato* saies) we come to the knowledg of matter. For from the knowledg of sensible matter, we are led to the knowledg of insensible: and so is matter related to form Natural, as Brass or Wood to the Form or Figure of Mercury. For even as Brass or wood, does in it self actually possess no artificial form; yet is it furnished with a power to receive al forms: even so the first matter, hath in it self, no determinate specifick natural forme; yet is it apt to receive all formes, howbeit herein they differ, in that the artificial matter is a body of it self existing and perfect: but the Natural matter doth not exist by it self without the form.

Matter is considered two manner of waies.

Now matter is considered *Two maner of waies*, one absolutely, as it is a beeing or a certain substance: the other, repectively, as it is a principle of natural things. In the first manner of consideration, we say it is void of all formes and Qualities, Dimensions and Quantities, and we allow it a power of receiving indifferently all formes; in which respect *Aristotle* in the *sixth of his Metaphysicks, Chap. 3. Text. 8.* Describes it by the negation of all things. *In the second notion* we attribute unto it a power of receiving particular forms, and privation; in which signification *Aristotle* in the first of his Physicks *Chap. 9. Text. 82.* Defines it, that it is *The first subject of every thing, of which every thing is made, being not accidently inherent, and into which it returnes when it is corrupted.*

The disinition of matter.

The first matter is no notion of the brain.

And although in its first notion, it can very hardly be known, because of its weak and obscure Entitie, by which it comes near to a Non-beeing, and is the lowest of al beeings: yet must we not think that it is a meer fiction of our Brains. For it is undoubtedly a real being, and indeed a substance, as appears in the I. *Of Aristotles Physicks Chap. 6. Text. 52. Chap. 9. Text, 79. In the Second de Anima, Chap. 1. Text. 7. In the Seventh of Metaphysicks, Chap. 2. Text 7.* For of it, and form al natural substances are compounded; and it is the subject of Generation, and receives the formes; and it self is in no other thing or subject. Now by substance, we do not here understand a compound substance, which is properly called substance, *but a being* as it is distinguisht from an accident, and opposed thereunto: which is *two-fold*: *One* in act, as the forme: the *Other* in power, as is the matter. Nor is it an incorporeal but a corporeal substance. For seeing of it and Form al compound bodies do consist if both were incorporeal, there would then arise from incorporeals a corporeal compound which is absurd. Moreover seeing a body of the predicament of quantity doth alwaies presuppose a body of the predicament of substance; nor can a body of the predicament of quantity exist without a body of the predicament of substance, nor this without that: and that a body of the Predicament of substance, as shal be said, doth immediately inhere in the first matter, and altogether depend thereupon: it must therefore needs be a body pertaining to the predicament of substance. And the first matter hath this its essence of it self, and as *Scaliger saies in his 5. Exercitation*, the matter by that essence which is proper to it self, is that which it is; and in his *17. Exercitation*. The matter hath its *quiddity* or *Somwhatness*, whereby it is somwhat, and differs from other things.

The first matter hath no existency of it self.

And although the matter hath an essence and entity proper to it self, whereby it is somwhat different from the form: yet hath it of and by it self no existency, which

is proper only to a compound, which hath it from the forme: which seeing the matter hath not (which its indetermination that I may so speak witneses) it cannot be said of it self to have actual existence, which is an effect of the forme, but only by the forme, which determines it, perfects it, and makes it to be this or that. The matter therefore is altogether a meer possibility, that is to say, a certain imperfect indeterminate substance, and a rudiment of all sorts of natural things, and which receives al its perfection and all its qualities from the form.

Yet this is thus to be understood, not that the matter is only a possibility to its own being, which it hath of it self by its own Essence; but to this or that sort of Being, as *Scaliger* saies in his 17. Exercitation. Nor is it said to be *Apoios* because it hath no quality, but because every forme and quality which is therein, is without and besides its Essence. For, as *Scaliger* saies, in his 61 *Exercitation.* The first matter, is one *Individuum* or particular being, like a lump of wax, one part whereof bears the form of a Candle, another the forme of an Image; another of a Ball, another of a Die: and the said mass may have as wel this form as that, and challenges none as properly belonging to it self, yet must it of necessity have alwaies some forme or other. Nor was the matter created by God as a certain distinct sort of a natural thing, but it is rather concreate or created together with natural things, and as was said it is as it were a rudiment, Beginning and part of al natural things, nor did it ever exist without any form but only with and under the same.

The first matter is unlimited.

Quantity doth properly follow the Nature of Matter, and is as old as it, nor can be separated therefrom, in deed or in thought. But it is only unterminated quantity I speak of, For terminated quantity doth neither follow the forme alone nor the matter alone, but both of them. For quantity of it self flows from Matter (for, by means thereof al things are termed so great or so great; and it also is the subject of all mutations. Now every thing which is changed, is divisible. *Phys.* 6. Chap. 3. 36.) But not from the forme; for it of it self hath no muchity, is not divisible, only it is extended, and is said to be so great or so great according to the extension and quantity of the Matter. But certaine bounds both external as the Figure, and internal as certaine sorts of Quantity, do proceed from the Forme. For as it streightens the Nature of the matter, and limits it to some peculiar and determinate sort of natural thing: so it limits the Quantity thereof, and imprints thereon, this or that sort and Figure of Quantity. And when we say the Matter, is unbounded, let not any one so understand us, as that the matter either is or hath ever been without certain limits. Nor is it said in respect of the forme to be introduced, in which respect the seed of an Oxe, if you regard the bounds it shal receive from the form of an Oxe may be called a certain unlimited thing; but in respect of all limits, which either it hath or may have from any form whatsoever. For as the matter considered in it self, is altogether without form; yet receives all forms, nor is ever without form: even so Quantity and Dimension of matter which follows the essence thereof, hath of and by its self no certain and determinate bound and Figure; yet is it fit to receive all, nor is it ever found without some Figure and determinate dimension. And thus unbounded and potential dimensions, are in a substance corporeal, unlimited and potential, such as is the Matter: but actual and determined, in a determined and perfect Body.

There is a two fold potentiality of the matter.

Out of the same Nature of the Matter, flowes *Possibility*, or *Potentiality*, which is an apitude or fitness to receive all Forms, and it is *two fold*, *Universal* and *Particular*.

2. *Universal.*

Universal is the Aptitude and propensity of the matter to receive all forms without distinction, and equally respects the two opposite principles, form and Privation, that is to say all forms alike. For matter, to speak properly, hath no appetite to Privation, as Privation, but as another form, and privation is not desired but another form annexed thereto. And this is termed *the first and indeterminate Potentiality*, and the Appetite of the matter, which is nothing else, but the inclination of the said matter to receive any forme. For it is not rightly said, that the matter while it is furnished with this form, does covet another; nor do the changes which happen by reason of the matter, but by reason of contrary forms, nor is there in the matter any appetite of change, but only of perfection. And every part is perfected under every form, and all the matter by all the forms; As *Scaliger* hath it in his 61. *Exercitation.*

Now

Now this universal Possibility, or Potentiality is not the very essence of the first matter taken in the first sense; but only a certaine accident and Natural Propriety, following the Essence thereof. Now no accident is essential to a substance. And though the matter be sometimes termed a Possibility: yet by this word is not understood a Quality, but its substance, which is imperfect, and as it were incompleat, having only a weak kind of Being: or it may be termed a potentiality, meaning a substance in *Posse*, and after this manner of speaking, Potentiality or Possibility is used in stead of a difference, to declare its obscure Essence, and which cannot be easily understood. And although also the matter in its first Notion is termed *Apoios* without Quality: yet may we allow some quality therein; but it must be such as makes no Restriction or Determination of the matter, and does not restrain it to a certain and specifick Nature, such as is an universal Potentiality. For seeing the matter is therefore said to be free from all Qualities and Forms, that it may receive all: and this universal *Potentia* or Aptitude, does not only not hinder but further the Reception of all Forms and Qualities; it is not to be taken from the matter. And this aptitude is as old as the matter and inseparable therefrom. For seeing the matter by reason of its universal potentiality, hath an aptitude to receive al forms; and every day by Reason of contrary Agents, some forms do perish: therefore this Appetite thereof can never be satisfied, and one form going away, it desires to be perfected by another. But this self same universal power or potentiality, is as it were of the Essence of matter, according to the second acceptation. For in as much as the matter is a passive principle; this Potentiality, is as it were its form and constitutes the same. For therefore matter is termed a material principle, because it hath an aptitude to suffer, But a *Particular Potentiality*, is that whereby the matter respects one determinate form: and this does not follow the Essence of the Matter, but is communicated thereto by the Agent, or the form and Qualities, which fit and determine the same, to receive this or that form. So the first matter, being furnished with the form of a Dog's Seed, hath no other Particular Aptitude save that of receiving the form of a Dog. This Aptitude is accidental to the matter, whether taken in the first or second sense, and separable therefrom. For when the *Act* comes, it perishes; and therefore neither does constitute its Essence, nor yet follow the same as an essential Accident. For the Matter, both as it is a being, and as it is a principle of things, subsists without it. For before it received for examples sake, this Particular Form of a Lyon, the Matter was actually in being, and when it shall have laid it down, it will remain in actual being. Seeing therefore this Determinate and Particular power or Potentiality, is not one alone, but many according to the variety of Forms, and the matter may exist without any one of them: none of them constitutes its Essence, or properly follows the same: moreover nothing Definite or Determinate does constitute its Essence; or can depend thereon. Possibility indeed or potentiality as such does immediately depend upon the Essence of the Matter, and is an essential accident or adjunct thereof: but in as much as it is definite, and respects this peculiar Form, it is not from the Matter, but from the the Agent and present Form, which is a privation of the Form to be introduced. And therefore it is not as old as the matter, but is separate therefrom (as hath been said) when the Act comes, it is separated. This Particular power or possibility, is only opposed to the Act, as Privation is to the Habit: the universal is not opposed thereunto. For *that* does not respect any peculiar Form: but an infinite multitude of them.

2. Particular

And this is the Doctrine of the Peripateticks concerning the first matter: yet not different from the Tenets of the Platonists, as we may see in *Alcinous* in his Book *de Doctrina Platonis* Chap. 8. in these words. *He* (viz. Plato) *cals the Matter, the Receptacle, Nurse, Mother, Place, and Subject of all things; and he saies that it is felt without sense, and comprehended by a bastard kind of reasoning. He will have it to be the property of matter, to receive al Generations, and like a Nurse to cherish them also to receive all formes, seeing it self of its own nature is void of all Quality, Form, and Figure. Also he saies that it is sprinkled and figured with shapes, like a Picture, having of it self no Figure or Quality. Nor were it a subject fitly prepared for sundry impressions of forms, unless it were quite void of all those Qualities, which it is to receive. For we see those that would make sweet ointments of Oyl do seek for Oyl infected with no smell at all: and those who would print forms upon Wax, or Clay, do first work & smooth & polish the*

matter,

matter, til the old figures are quite blotted out. For it is fit that the universal matter, if it be to receive all forms, should not have in it self the nature of any of them, but that without all Quality and Figure, it must be the subject of several sorts of things. And being such as is said, it is neither a Body, nor yet incorporeal, but potentially a Body, even as Braß is potentially a Statue, because receiving the figure it may become a Statue.

Privation and Negation how they differ.

The *other* Principle of Generation is *Privation.* That we may understand what that is, we must see how it differs from negation. For Negation is of larger extent than Privation, and is attributed to matter taken in the first sense, and denotes an universal Absence of all forms and Qualities in the matter. But such is not privation: (for one Privation is not opposed to all forms, but to every one a proper) but it agrees to matter taken in the second sense, and alwaies presupposes other Qualities, and is necessarily conjoyned with some form, which goes next before the Form to be introduced. For the Privation of the form of Wheat, is not an universal negation of all formes in the first Matter, nor yet every other absence thereof, as for example sake, that which is in Iron: for Wheat is not generated of Iron: but that which acompanies some definite and determinate form, *viz.* that of the grain of Wheat. Hence *Themistius* upon *Aristotles Posteriora*, writes thus; Privation is a Negation in a determined subject, and *Alexander de Ales* upon the Metaphisicks; Privation essentially requires the Negation of a form with an aptitude to receive the same. And the very same *Scaliger* affirms in his 18. *Exercitation.* Privation (saies he) seems to have the Nature of a certain Being. For it is the same after a sort with that Habit, which is contrary to the Habit, whereof it is a privation. And therefore as *Zabarella* saies; Privation is in its own nature, the absence of a form, and it is nothing, and is opposed to a form only Privatively, but inasmuch as another form alwaies accompanies the same, in which respect the privation of that thing is properly said to be some positive thing having contrariety thereunto. We gather therefore from the Premises; that *Privation* is the Absence of a form in that Matter which is immediately disposed to receive the same. Now Prvation is not of the Essence of Matter, but an accident thereof being taken in the seond sense, being necessary, not simply, but in respect of Generation. For it concurs with other Principles to the Generation of a thing; and it is in Generation as it were the term from which the motion is made. For that which is generated, was not before; yet it was possible, and in generation not being goes before Being: and therefore it is called a third Principle essentially distinct from matter: and matter concurs *one* way to Generation: Privation *another.*

what Privation is?

It is not of the Essence of Matter.

The Form

The *third* Principle of natural things we make to be the *Form*, which because it is the most excellent of all, it requires more diligent consideration. That there is somwhat in things besides the Matter, called Form, all in a manner do grant: but what that is, whether a Substance or an Accident, all are not agreed. For there were both Phylosophers of old, and some there are at this day, who conceive there is no substantial form in the matter. Yet verily, that is the truer opinion which saies that there is in every natural thing, besides the matter, some substantial form, which is naturally before all the accidents or adjuncts, both common and proper. For the Parts of a Substance, are themselves also substances. And if things did consist only of matter, the Essence and operation of all things, would be one and the same, and there would be no true distinction betwixt them. For from accidents a true diversity and distinction of Essence and Operations cannot be drawn. For the Act and essential perfection of a thing, whence its difference is taken, does belong to the same kind, wherein the thing is placed: or as *Toletus* saies, No imperfect thing in any kind is pefected in that kind, save by somwhat of that kind. Since therfore Matter is an imperfect Substance, and is perfected in the compound; it must be perfected by another Substance, *viz.* The Form. Moreover, the diversity of Accidents and Operations, whence proceeds it? Why is the fire not cold, but hot? not by reason of the matter: for that operates nothing, makes no distinction, but is void of al Quality. Therefore we must presuppose somthing more noble than an accident. Finally, if the Form were an Accident, there would be no Generation of any thing, but only an alteration.

The form is of its self an incorporeal Substance

The Form therefore is a Substance of it self; and indeed incorporeal; of it self void of all Quantity, Demension and Division. But it participates of Quantity by Accident,

Accident, *viz.* inasmuch as it is inherent in the Matter, according to the extension and division whereof, it is extended and becomes divisible. For as the matter is not, so neither is the form perfect of it self, nor constitutes any sort of natural things; but it concurs together with the matter, to make up the compound. And therefore neither the matter nor the form, hath of it self all things requisite to make the compound; but each wants the others help, and they mutually assist one another. The form wants the matter to sustain it; and therefore some call the Matter *Principium Subjectivum formæ*, the Principle of the form, or that Principle wherein the form resides; upon which the form depends in its making and conservation. But the matter is perfected by the form and from it receives its actual being and perfection, and therefore some call the form, the formal Principle of the matter; not because it gives it its Essence, but because it perfects the same. The whol nature therfore of the Form consists herein, that by a real conjunction with the matter, it may give it that perfection which is proper thereunto, and so with it constitute the compound. And therefore it is by *Aristotle* in the second of his Physicks Chap. 3. Text 8. defined to be, *That which makes a thing to be what it is*, and in his 6. Book of Metaphysicks Chap. 8. I cal the form that which makes a thing to be what it is, and the first Essence of a thing; and in the 6. of his Metaphysicks Chap. 11. *For the form is the inward substance of a thing, from which also the whol matter is called a Substance.* For the form is a simple substantial Act, with the matter making one entire compound. For this is the end of Generation; by it the matter is perfected; it is coveted by the matter; herein the matter finds it self contented; from it al accidents and actions flow.

The Original of Forms.

But, *Concerning the original of Formes*, there is a very great controversie amongst Phylosophers, which hath exercised the Brains of the most able amongst them; nor seems it as yet sufficiently determined whence the forms have their Original. For though *Aristotle* and his Expositors do say, That neither the matter is generated, nor the form, but the compound yet their Intent is not, that both the matter and the form are generated at one and the same time (for the matter is not generated, nor can be) or that some third thing different from these is produced; but this they would signifie: that the form is not produced by it self apart from the matter and without it, and afterward joyned thereto; but that it is produced in the matter and joyned therewith. For the compound is nothing but the matter and form joyned. Therefore we must grant that in some sort the form is made, inasmuch as it is the Butt and End of Generation.

Whence the forms proceed?

This being granted we must see *Whence the forms have their original.* If you shal ask a Peripatetick or follower of *Aristotle* (setting aside at this time the Opinions of *Anaxagoras Plato*, and *Avicenna*) He wil tel you they are drawn out of the Aptitude or Potentiallity of the matter. I hear indeed (to use the words of *Scaliger* in his 61. exercitation) the sound of words; but I desire somthing to satisfie my mind: but I hear nothing. For though this expression be worn thredbare by many yet few do sufficiently explain what we are to understand thereby. But this seems to be the opinion of those who do think most rightly: for forms (excepting the humane Soul) to be drawn out of the power of the matter, is nothing else, but for them to be so made in a subject having a natural aptitude unto them, and existing before them both in time and nature, as that both in respect of their conservation and operation, they do so depend thereupon, that out of it they neither can be made, nor preserved, nor operate. For the form which is educed, is not at first produced apart from the matter, and out of it, and afterwards externally adjoyned to the matter, but it is produced in the matter. And so *two* things are required to the eduction of forms: *First*, That the Subject have a natural aptitude to the form: *Secondly*, That the form which is drawn forth, depend upon the matter both in their making and conservation; that is to say, that without the help of the subject, and out of it, it can neither be produced, nor preserved, nor operate. And consequently al natural forms, except the humane, do so depend upon the matter, that out of it, and without the assistance thereof, they cannot be.

What it is for forms to be drawn out of the power of the matter.

Whether the Form be made of nothing in the matter

But if any man, not content with what hath been said, shal further urge, and say, that he acknowledges what hath been said to be true, *viz.* that for a form to be drawn out of the aptitude of the matter, is nothing else, but for a form to be made in the matter, and not out of the same: but shal yet enquire; whether in the matter,

Form is made absolutely of nothing. Which *Picolominæus* seems to conceive in his 1. *Book of Creation Chap.* 7. So that the Agent affords nothing of its own Essence thereunto, but action only; or so as that the Agent does not communicate the Forme it self, but brings the Aptitude of the matter to such a Form into Act, causing the Potentiality of the matter to break out into a formal Act. But whether a new Form comes out of the Essence of the old Form, is an hard question to answer.

The Original of the forms from whence it is?

For seeing naturally, nothing is made of nothing, and a Form is now in the matter which was not there before, the Question wil be, whence is its Original? How the Interpreters of *Aristotle* do torment themselves, about this point is every where to be seen, and among the rest out of *Toletus* in his Comments upon the 1. of *Physicks* Chap. 9. quest. 19. and upon the first *de Generat.* and *Corrup.* Chap. 3. Quest. 2. where he reckons sundry opinions of the Peripetaticks in this point. For in the first place, some mentioned by *Du-Rand* in his 2. *B.* upon the Sentences D. 18. did hold, that there did precede in the matter certain Entities, out of which afterward the Forms were made, *viz.* several forms out of the several Entities, and these Entities or Beings, they called Possibilities of Forms. Secondly, Others think, that the parts of the forms precede in the matter, but very remiss, and that afterward they are in Generation vigorated and that so every form is precedent in the matter, in a weak manner of Being. Thirdly, *Albertus Magnus* held, that al forms did essentially precede in the matter, so the that Matter is a kind of habit prepossessing al forms essentially.

But *Toletus* acknowledges the Absurdity of these opinions, and therefore he determines, that there was nothing of the form in the matter, which did precede the introduction thereof; and this he proves by firm reasons which you may see in the forecited place.

Others that they may avoid these absurdities, do attribute this power to the Efficient, and some with *Plato* make the Ideas to be the efficient Causes of the Forms: and others since have brought in the Soul of the world to that intent: *Avicenna* hath invented a tenth Intelligence, whom in his own language he cal's *Cholchodea*, & gives him this office of making forms. *Fernelius* with some others makes the Heaven to be the efficient cause of forms. But if that were so, Generation would not be univocal, and the form not having been in the matter, must be held to be created. Howbeit that does not please other peripetaticks. Wherefore *Piccolimineus* in his 2. *B.* of the Principles of Natural things, although he grant, that the form is in part made out of nothing, because nothing of it was before in the matter; yet he denies that it is created, because it presuppose's a Subject, out of which it is educed. But *Tolet.* in his 1. *de Gener. & Cor.* sees that this answer, which was also *Marsilius Ficinus* his answer, wil not hold, and therefore he writes: This Doctrine does not please me. For verily if the production be of the form it self, seeing no part thereof was precedent in the matter, it must be called a Creation. And the truth is, whether the form be produced in the matter or out of it. if there were nothing thereof precedent, it must be a Creation; which himself acknowledges ought not to be attributed to natural agents.

He therefore, to free himself from this difficulty, determines: that what is first generated and corrupted is the compound; and that the form is not produced by it self, but comproduced and made together with the production of the compound, and that the Action is first terminated upon the compound it self, and consequently and as it were by accident upon the form.

But in very deed, whether the Form be made in the first or second place, or consequently, whether alone or with the compound, the Question remains just as it was; *viz.* Whence the form, which now is in the matter and before was not, hath its Essence; whether it did præexist in the matter, or was made by conversion of matter into form, or of nothing. For it does not follow that if the finger be made with the hand it is therfore made of nothing. Yea the compound should rather be said to be made consequently and in the second place, than the form. For as whiles Wood, Bricks, Morter and other things are made and compounded, an House is consequenly made: even so a natural compound, which is nothing else but matter and form, is made, when the Matter and Form is made. And seeing the matter is not made, what else shal we say is made except the Form. And therefore when he observed, that he neither satisfied himself nor others; and saw that no part of the form

did

did preexist in the matter, nor could a power of creating be attributed to Natural Agents; at length in his 1. *de Gener. and Cor. Chap.* 3. *Quest.* 2. He concludes: I confess this is an admirable power and Virtue, which partakes somwhat of a creating power: but it is no such creating power: seeing it hath alwaies subjects to work upon. Also the Virtue of the matter is wonderful, out of the Aptitude whereof things are produced, which actually are not there. But in very truth, that virtue is not wonderful, because there is none such, but their wilfulness is wonderful, who will have that to be drawn out of the matter, which is impossible, as not being in the power either of the matter or of the Agent. For many men had rather rest upon certain principles, which cannot satisfie minds covetous of the truth, then make profession of that which is the manifest and solid truth. Which they perhaps therefore do that they may be thought good Phylosophers: whereas, doubtless, *Aristotle* if he had known the first and true Original of Forms, and the Creation of the world, as we do, he would have left us, a Natural Phylosophy better and more compleat then he hath done.

Let us therefore to whom these things are made known out of the holy Scriptures, omitting those opinions, which endeavour to bring the Forms out of the matter, or from Heaven, or from elsewhere, determine that the Forms themselves, as also the matter, were at the beginning of the world created with the things themselves, that of them all Natural things might consist: And that the first matter cannot indeed be generated but that by means of the Forms, all changes of generation do happen, and that the Forms are the second principle of Natural things, by which they are that which they are, and do that which they are commanded to do; that according to the Forms al Naturul things do not only act, according to their Nature, that is to say, as the Creator hath commanded them to act, but thereby they are governed, preserved and propagated. For God commanded, that natural things should not only exist by their Forms, but propagate themselves thereby, and as he commanded it, so he gave every of them a power to do so as he commanded, and forthwith to encrease and multiply which command of God (that no man may bring the Forms out of Heaven) appears to have been given out before the Heaven was created. *Genesis*, 1. verse, 11 and 12. *And God said let the Earth bring forth Grass, the Herb yeilding Seed, and the Fruit tree yeilding Fruit after his kind whose Seed is in it self upon the Earth: and it was so. For the Earth brought forth Graß, and the Herb yeilding Seed after his kind and the Tree yeilding Fruit, whose Seed was in it self, after his kind: and God saw that it was good.* All Natural things do therefore obey the command of the Creator, and al Forms, as in the first creation by a power put into them, do beget by promotion and propagation of themselves; they remaining nevertheless in the mean while entire; which also we see in Plants and Animals, which generate by Seed. For they when they afford Seed do afford somwhat of their matter and somwhat of their form. For the Seed of a plant while it is in the plant, is animated with the Soul of the plant. But when it is separated therefrom, that portion of the Form, which is Inherent in the Seed, and together with the matter, of the Seed is separate from the Plant, grows into a plant like to that from whence it came. And the same holds in Animals. And therefore the Form is Potentially in the Seed; because as *Scaligar* saies *in his 6. Exercitation, Sect.* 5. The Seed is able to give the Form: it is therefore drawn out of a remote possibility, which is the first act, to a near possibility, which is the Second Act. So that the Form is in the same matter, after the same manner as, to need no helps, but to enjoy its End and to which the whol compound is ordained: which is then brought to pass, when the Form does constitute its own matter, and Alter, Labor and dispose it as if it were its House. And therefore when a living Creature is made of the Seed, the Form is not then first induced thereinto, but exists therein already being communicated by the Ingenderer, and it does only by assistance of the wombs Heat display it self; which is rather a certain arising or springing out, then a drawing out. To be short: This is common to all Forms (though to some in a more noble, others in a more inferior degree) that they can multiply themselves, are incorporeal, have of themselves no dimension or Quantity, nor do of their own Nature take up, but do fil. And if we suppose the Body of any Animal or Plant to grow never so big, yet the same Form without any Addition will fil it all: and though it be never so much lessened, the Form is no waies lesse-

ned or impaired. But let us conclude this discourse with the words of *Scaliger* in his 307 *Exercitation, Sect.* 29. *The matter is a possibility, apt to be perfected: the Form is an Act, fit to perfect. And thus we see the shallowness of mans understanding, who is so bold as to say he knows the Forms of substances. But this exquisite knowledg is hid from our Eyes:* viz *How of two things, one is made. How the Form is totally in the whol and in every part of the compound. So divine a thing is the Form, that being a substance, it fils another substance so ful of it self, that of both one is made. Wherefore to search further, is the part of an overcurious and busie mind. For it is a part of Mans Wisdom, to be willingly ignorant of some things.* Yet we must not reject as falf, such things as are hard to be known. For (as *Plato* saies in his Dialogue called *Theætetus*) *they are profane who think there is nothing, but what they can feel and handle.*

Chap. 4. *Of Nature and the Causes.*

Divers significations of the Term Nature.

THere are sundry Significations of the word Nature, which you may see in *Aristotle, in the* 5. *of his Metaphysicks, Chap.* 4. *And in* Pererius, *in the* 7. *of his Physick, Chap.* 1. *In* Piccolomineus, *in the* 2. *of his Physicks,* p. 249. *In* Fonseca, *in the* 5. *of his Metaphysicks, Chap.* 4. I shal cite only some which are most suitable to our present matter in hand. And in the first place, some cal God himself by the name of Nature. Again, others take Nature for the second Causes; in which sense *Scaliger, in his* 188. *Exercit. and* 359. *Sect.* 11. seems to define it to be the ordinary power of God. Thirdly, Nature signifies the whol Universe of things. Fourthly, Nature is taken for the Essence of every thing; in which sense we say that things separate from matter, as God and Angels have a Nature, that is to say an Essence. Fiftly, Natural is opposed to voluntary, so that a thing which acts without deliberation is called Natural; and that which acts with Deliberation, Voluntary. And yet more strictly, Natural is opposed to Animate, and Nature is taken for a Faculty opposite to the knowing Faculty. For seeing the knowing Faculty respects both parts of the opposition, and is apt to do as wel this as that contrary: Nature, contrariwise, is said to be that which respects but one contrary, and is only determined thereunto. Finally, in a certain middle way, betwixt these last significations, Nature is said to be the internal principle of motion; and every thing is said to be Natural which is mutable and variable. And in this place we treat of it, in this last signification: and that we may the better find out what it is, let us see how Natural things differ from things Artificial.

Things Natural and Artificial how they differ

All things in the whol Universe are of two kinds: some are from Nature, as the Elements, Living-Creatures and their Parts, Plants, *&c.* And some again are from other Causes, as Art, Counsel, Fortune, Chance. And although things Natural differ from Artificial many waies, as may be seen in *Pererius, Lib.* 7. *Phys. Chap.* 2. Yet this difference shal serve our turn: that Natural things have an inward Principle of their motion and rest: But Artificial things, as such, and of themselves, have no such principle. For whereas a Statue or Image tends downwards, it does it not as a Statue: But as consisting of Stone or Wood. Since therefore Natural things are hereby differenced from Artificial, Nature is not unfitly defined to be *the Principle of Motion and rest in that thing wherein it is primarily, of it self, and not by accident.*

The definition of Nature.

But before we pass to other things, that this definition may be rightly understood, some things are to be hinted. And in the first place you must observe, how Nature is said to be the principle of Motion and Rest. For it is not so to be understood, as if Nature did effect both these together: but one after another. Nor as if there were the cause of both in every Natural thing. For every nature is not the principle of Motion and Rest. But it is thus to be understood, that all things which naturally move and rest, have this motion and rest from nature. For there are some things that alwaies rest; some which are alwaies moved; some which both rest and are moved, and yet nature is the Cause of al these. Moreover, this is not to be forgot; that every nature is not the principle of every motion, but this of that, and another of another; nor is every natural body moved with all motions.

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And by Rest we do not understand every Cessation from motion, and every privation thereof: but to rest, is to remain in its Natural place. So Earth, when it comes to its place, it hath a Principle whereby it Naturally rests therein, and removes not therefrom unless by violence forced. And whereas in the Definition it is said, that Nature is a principle of motion and rest, in that wherein it is; thereby, Nature is separated from Art and from an external Agent, which are the Causes of a Transient operation only. Yet, I deny not but that Nature is the cause of a Transient Action. For Fire heates also other things. Howbeit, *Aristotle* would define Nature, only by an immanent Action, because thereby it is manifestly distinguished from Art. And if the definition of *Aristotle* be so explained, that Nature is the internal principle, from which every thing hath a power of acting and suffering, and ceasing from both; all seeming difficulties wil be cleared up.

A two-fold principal of motion active and passive.

The passive what?

And because the principle of Motion is twofold, one Active, by which the motion is effected, another passive, Wherein? hereupon arises a double controversie amongst Authors. First what we are to understand by a passive Principle: Secondly, whether Nature be both these Principles or only one of them. As to the First, a passive Principle may be understood two manner of waies, First for the passive Aptitude of things opposite which is free, and not more apt to receive of it self, one motion more then another, but is equally propense to both: Secondly, For a power already restrained, and limited, to one only of the Opposites, and Determined to one Motion, which is said to be the Natural motion of the thing. I am of the latter opinion: for from the former, this absurdity seems to follow that all violent and Artificial motions, may be called Natural; seeing the first matter is of it self alike disposed to receive all Motions.

Nature is a principle as wel active as passive.

As to the other Controversie: although some have said that Nature is only an active principle, others that it is only a passive; Yet I conceive, both may well be affirmed of Nature. For to things having Nature in them, it is no less Natural to move themselves, then to be moved by themselves.

To what things the term Nature may be applied.

And from what hath been said it is now apparent what is Nature in things, *viz.* The principle of motion and rest, both active and passive. It remaines that we now declare, what that is, and to what things the name of Nature is due *Aristotle* gives the name of Nature both to the matter and the Form: and that not amiss, provided he be rightly understood. For the Form alone primarily and of it self deserves to be called Nature: and it is a Principle of motion as well active as passive. But because the matter is indifferent and doubtful, disposed to receive contrary motions, respecting no determinate motion, but al indifferently: it cannot primarily and properly be called nature. For so, as all natural things have one matter, so should there be of all but one Nature: whereas nevertheless every thing hath its own peculiar Nature. Yea, if so be the matter as well as the Form were Nature, every thing should have two Natures. Nor is it absurd to cal the Form a passive principle. For seeing, as hath been said, a passive principle, is not so called, in respect of every indeterminate motion; but only of that determinat and certain motion, which is peculiar and natural to every thing: by very good right, the Form also is called a passive principle; since from it proceeds al determination and restraint of matter to the reception of certaine determinate Motions. Now the Form is termed a passive principle, in as much as it is in the matter (for in respect of the matter every thing is said to suffer) and determinates the Nature thereof: and in as much as it is the Form, it is also termed an active principle. The matter, notwithstanding as hath been said is also called nature: not because it is nature of it self; but only potentially: or because it hath an aptitude to receive the Form, which of it self is Nature. Actually therefore the Form is nature; potentially the matter.

The Form is cheifly Nature.

The whol Sum therefore of this discourse is this: One thing hath one nature, which properly and primarily is called the Form. For this of its self is the active principle in things, and in as much as it is the Form: and also the passive, in as much as it determines the doubtful nature of the matter. And therefore to be a passive principle, is in divers respects attributed both to the matter and the Form. For the matter is the Passive principle, not as it is barely the matter but in as much as it is furnished with some Form, whereby it is determined to receive some particular motion. The Form is a passive principle, not as it is the Form, but as it determines

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the doubtful nature of the Matter. And thus neither of them without the others assistance, can be called a passive principle.

whether every Form informing be Nature

From what hath been said, it may easily be collected, what may be determined in reference to that controversie, Whether every Form in forming, is to be counted Nature, or not. The Definition, truly, of Nature doth evince: that every form informing, inasmuch as it is inherent in the matter, and informs the same, may rightly be called Nature.

Things natural & according to nature, how they differ.

It is now manifest what and what kind of thing Nature is. One thing must yet be added: What that thing is which hath Nature, and what that is which is according to Nature. Natural things are Substances which have nature in them, *viz.* A principle of motion and of rest. Such are only natural Bodies. For that thing is not called natural, which produces any thing that is natural; for so God himself should be reckoned amongst natural things. Nor is that said to be natural, which is produced by naturral motion; for so the first Man and this whol world should not be natural. But that thing is properly natural, which hath an implanted Principle of its motion and rest. And such a definition of a natural Body, does comprehend all bodies both Celestial and sublunary. But according to nature, is of larger extent, than having Nature, or Natural; for according to nature, are not only the Substances, but also their properties, and their affections or adjuncts which follow their Nature. *And so much of Nature may suffice to be said.*

But inasmuch as nature is chiefly considered in this place, as it is referred to motion, or, as they say, it hath a peculiar Causality over the motion and rest of that thing wherein it is: the *Causes* are now to be explained, *viz.* inasmuch as they have respect to motion; and we are to consider what kinds of Causes have place in things natural. They define a *Cause* to be that by the virtue or efficacy whereof any thing is made: or by which any thing is of it self produced. Now they are four: The Matter, of which a thing is made and subsists: The Form, by which a thing is that which it is, and nothing else: The Efficient, whence proceeds the Beginning of Mutation or Rest: The End, for the sake whereof a thing is. Nor is there need to invent more Causes; seeing by these we can sufficiently Answer any Question, why a thing is, and whereby the cause thereof is demanded. Yet there are more Modes or manners of Causes. For a Cause is neer or remote: of it self or by accident; in act or in aptitude, simple or conjunct, of which see *Aristotle* in his 3. of *Physicks Chap:* 3.

what a Cause is, and how many causes there are?

The Manners of Causes.

Fortune & Chance, how they differ?

To Causes by Accident, Fortune and Chance are referred. For seeing some things are made alwaies or for the most part, others seldom; again some are made for some ends sake, others for none: and those which are made for an end, are made either by Election or without Election: Fortune and Chance are said to be the Causes of such things as happen seldom & without an end propounded. And herein Fortune and Chance agree, that they are both the Cause of such things, which are not alwaies or for the most part, but seldom effected, and which are undertaken for some Ends sake. Yet herein they differ, that Fortune is of things done with Election, and Chaunce of things done without Election.

what Fortune is, and what Chance?

Fortune therefore is the Cause by accident of these things, which among things done by Election and for some end, do not alwaies nor frequently but seldom happen. And in such a sense we may grant, that there is both Fortune and Chaunce in things. But in respect of the most great and good God, nothing happens by chaunce or by fortune.

whether it belong to a natural Physosopher to consider the Causes?

But it is the part of a natural Physosopher to consider all the four kinds of Causes, and by all four answer may be made to that question why or how a thing comes to be, and that physically. For it is the part of a Physitian or natural physosopher, to consider the Parts and Principles of a body natural. And to him it belongs, to explain the mutation and generation of things and their causes; and to see for what things sake, the Efficient acts, or to enquire into the end: moreover to weigh and consider what is made, or what form is introduced afterwards, to know what that is which suffers and receives the form, *viz.* the matter, finally to search out the efficient which introduces the form.

Howbeit we are to know, that the three Causes, Efficient, Form, and End, are in natural things many times united together, and grow into one Cause: so that the form and end, though they differ in definition, yet in number

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and subject they are one Cause: but the formal and efficient cannot be one in number, yet one in kind. For the same form of an animal, is at the same time both the form and end: the form in respect of the thing Generated, inasmuch as it is an act perfecting the matter, and therewith making up the compound: but an end in respect of the Generation. For it is the Butt to which nature tends, and wherein she rests contented after it is attained. Moreover the same form is also the Efficient, inasmuch as the thing generated, is of the same species or sort with the Generator.

This thing also is to be noted, after what manner every cause, does concur to the Production of the Effect. The End concurs to the production of the Effect no otherwise than as it moves the Efficient to produce the same, and after the thing is effected, all the causality thereof ceases. The Efficient concurs sometimes only to the production of the Effect, and sometimes also to the conservation or preservation thereof; which latter efficiency does chiefly belong to the universal Causes, which *Scaliger* does excellently shew, in his 28. *Exercitation. It is not* (saith he) *necessary, that the particular efficient Causes should be perpetuated together with their Effects: but then only to stick to them when they work. For it is enough that they give them their form, whereby not only they are, but are preserved: since out of their matter the qualities being driven by their contrary, the form also is forced away. Only the first Efficient, because he is Lord of Eternity and the world, accompanies his effects: there is no necessity that other Efficients should do so: no not the Heavens themselves, otherwise than by his favor and Indulgence.* So far *Scaliger*

But the Matter and Form are necessary both for the Production, Constitution and Conservation of the thing.

And although there were anciently, some who thought all things were made at random and by hap hazard: yet we avouch that God and Nature do nothing in Vain. Yet we do not here introduce a simple Necessity, but only a conditional, and therefore we do not deny all Contingency in natural things.

Many things might be added touching the Causes; but all that may be said of them, belongs not to our present Purpose, also I endeavor to be as brief as may be. Only one Question we shall here discuss, *viz.* Whether an accident can produce a Substance. There are about this Point Three Opinions. The first is of some late Writers who aver, that an accident by its own proper Virtue can produce a Substance? so that when Fire produces fire, that whol production intrinsecally and effectively proceeds from Heat, nor does the substantial form which is in the fire concur to the effect. The second, is the Opinion of *Scotus*, *Ocham*, and *Du-Rand*, who teach, that Accidents can neither by their own proper Virtue, nor the power of substantial forms, produce a substance: but that a substance is immediately produced by a Substance. The third is the opinion of *Thomas Aquinas*, who avers: That accidents do not produce a substance by their own proper force, but by the power & virtue of the substantial forms, whose virtues and Instruments they are. This last opinion seems to me most probable. For that substances act mediately, any body may hereby learn, inasmuch as the things between which there is action and passion, are many times, we see, in several places: whereas, nevertheless a mutual contract betwixt the Agent and Patient is necessary, and the Agent and Patient ought to be together. And that Accidents cannot of themselves produce a substance, does hence appear; in that whatsoever is in the effect, does præexist in the efficient cause. For nothing gives that which it self hath not, either formally or eminently, as they say.

Whether an accident can produce a Substance?

Chap. 5. *Of that which is continued, and of that which is infinite.*

NOthing is more intimately inherent in a natural Body than Quantity; as being of equal durance with the first Matter, and altogether inseperable therefrom, and by help whereof, all the remaining Accidents do adhere to the Matter. Yea and by a Body in the predicament of Quantity, we come to the knowldg of a substantial Body, which is nothing but a substance that hath three dimensions of Length, Breadth, and Thickness. For these differ one from another, like Substance and Accident. In Subject they are one. For that Body which consists of Quanti

ty, is not without a ſubſtantial Body: but they differ eſſentially, having different eſſences, when no man thinks of them.

What continued Quantity is & how many fold. A Line.

Now continued Quantity is that whereof we cheifly treat in this place; whoſe bounds are one; or whoſe parts are coupled with a common boundary. And there are three ſorts thereof; a Line, a Surface, and a Body, each of which hath its peculiar Office and Peculiar bounds. For a Line is a Longitude without Latitude, the bounds of a Surface. The bounds of a Line is a point: whoſe Nature is to continue touch, terminate. For it begins, continues and ends a Line. The Nature alſo of a Line is to continue, Touch, Terminate, and alſo to divide. For by a Line a Surface is continued, and Terminated, and by the ſame, two Surfaces, do mutually touch one another: Finally by means of a Line, every thing is diviſible according to one dimenſion, *viz.* Longitude. A Surface is a Quantity long and broad; by means whereof Bodies are continued, do mutually touch one another, and are divided. For by means of the Surface, a thing may be divided according to a two-fold dimenſion, *viz.* Longitude and Latitude. Finally, a Body is a Quantity, Long, broad and deep. And its Office is not to continue, terminate or touch; but to fil and poſſeſs, and to be apt to be divided according to its threefold dimenſions, Length, Breadth and Depth.

A Surface

A Body.

Things poſſeſs a place only in regard of their being bodily.

Thus therefore, in reſpect of all dimenſions things are ſaid to have Quantity and to be diviſible: but in reſpect of a body only they poſſeſs and fil. For that two bodies cannot be together in one place, is not becauſe they are ſubſtances: For divers incorporeal ſubſtances, may be together in one and the ſame place: but becauſe they have matter furniſhed with a threefold dimenſion, the Penetration whereof is impoſſible.

To take up and fill do differ.

Here I muſt take leave to digreſs a little, and propound ſome things not much from our purpoſe, To poſſeſs or Occupy, and to fil, is for a body to be ſo in a place, as that another cannot be in the ſame place with it: and it is proper to ſuch things as have matter of a threefold dimenſion. For ſuch things do ſo take up the whol place, that another Body at the ſame time cannot be therein. But thoſe things are ſaid to fil, which may either in any of them together, or with other bodies, be in a certain place, ſo that the Preſence of one ſhall not hinder the preſence of another. And therefore two bodies can never be together, nor can two hold the ſame place: and as the common experſſion is, Penetration of Dimenſions is impoſſible. For Naturally it cannot be, that into that place which any of us fils, another Man, or any other Body, ſhould be admitted, til we leave the ſame. But it is otherwiſe in things free from dimenſion and Matter, and in all Forms, ſubſtantial and accidental, which is manifeſtly apparent in the light of the Stars, for the lights of infinite Stars, are every where ſhed and ſpred about under the Concave of the Moon, nor do the Elements at all hinder them, by whom this ſpace is before poſſeſſed, nor does the preſence of the one hinder the preſence of the other, nor though they are all of them in all places, are they confounded or jumbled together. The ſame we ſee in other things which give light. For if you place Looking-Glaſſes upon the walls of a chamber round about, and ſet candles in the middeſt of the ſaid Chamber. They will all ſend their image and light into all parts of the Chamber, already ful of Aire, nor will the preſence of one hinder the other, nor wil they be mixed or jumbled together: but they will all appear diſtinctly, in all the Glaſſes. So in Honey, in all parts thereof there is yellowneſs, and ſweetneſs, and ſmel and moiſture. And the ſame happens in ſubſtantial Forms. For both our Soul and the Soul of all living Creatures, does fil all the Body, which it informs, nor though a Body have before taken up the place, is it hindred from being in all parts of the Body. It is therefore the Property of things which have dimenſions and are corporeal, to poſſeſs and take up: but of things free from dimenſions and matter, to fil: and by how much a thing is more free, from dimenſions, Matter, and bodily bulk, by ſo much the more it fils. Hence we ſee a ſound fils a greater ſpace, then a ſmel, and colors greater then ſound; and the light of fire yet a greater, and the light of the Heavenly bodies, a greater then that. Finally the moſt good and great God being infinitly free from all dimenſions and from al matter, does infinitely fil all things, yea is himſelf an infinite fulneſs, abſent from nothing, included in nothing, nor mixt with any thing; but is totally al the world over, and totally every where without this world. For though he is preſent with all things, yet is not

Why two bodies cannot be in one place?

God is preſent repletively

ſome

some part of his plenitude present with one thing, another with another, but he is wholly present with all things. Finally this world is made in the Atome, indivisible point or Centre of his fulnes. And therefore, al things void of matter, and all forms, of themselves, have neither Quantity, nor can be divided, unless by accident, in as much as they are inherent in a body by whose dimensions they are bounded, and may be many of them together. For dimensions being taken away, the Form of any of us, may be with the Form of another, in the same place, and fil the said place, nor should the presence of one hinder the presence of another. And we see the same Form, which at first fits the Body of an infant, fil the said body without encreasing it self, when the infant is grown to a tall Person.

Forms of themselves are without Quantity and indivisible

But let us return to Quantity: where we are fallen into that most noble question which hath exercised the wits of so many renowned Men: *viz.* Whether a continued Body is made up of indivisible parts, or of parts divisible? And whether that which is continued may be divided infinitely? There were anciently some that held, that a continued Body was compounded of indivisible parts, as *Pythagoras*, *Democritus*, *Leucippus*, and the greatest part of those who flourished in *Aristotles* time, and the Stoicks themselves who in this point followed their Ringleader *Zeno*. But *Aristotle* undertakes their refutation, in the Sixt Book of his Physicks. Also they are opposed in that which is called, *Of Indivisible Lines*, which goes up and down under *Aristotles* Name, which some deny to be *Aristotles* Book, though according to his judgment, and collected from his publick discourses. And in this point the most excellent Phylosophers and Mathematicians do follow *Aristotle*. And though weighty Reasons be alledged on both sides yet shal I side with *Aristotle*, and that for these Reasons following.

Whether that which is continued be made of indivisible or of divisible parts?

In the first place, if that which is continued be compounded of indivisibles, as for examples sake, a Line of Points, one indivisible with another, wil either make a thing continued, or a thing contiguous, or a thing whose parts are ranked one after another. But none of these can be. And therefore that which is continued is not compounded of indivisibles. Indivisibles are not continued. For continued things are those whose outmost bounds are one and the same. But the outmost bound of Indivibles is not: for every extream is distinct from that thing whose extream it is. And therefore indivisibles are not continued. And for the same reason likewise they cannot be contiguous. For those things are contiguous whose extreams are together. The same is also thus proved. What ever touches another thing, touches it either as an whol touches an whol, so that all its parts are together with the parts of the other, or as a part touches a whol, or as a part touches a part. After these latter manners, things indivisible cannot touch one another: for that which is indivisibe hath not parts, nor can it be parted. Nor yet after the former manner. For every thing continued, hath parts without parts, so that one part is seated here, another there. If therefore in the making of a Line, the points should totally touch one another, and in making a surface, the Lines should totally touch one another; Finally in making a Body, the surfaces should wholly touch one another: from all the points would spring one point, and from all the lines one line, and from all the surfaces one surface only. And so a thing indivisible, added to what is indivisible, makes it no greater then it was; nor does it constitute a thing continued, which consists of many parts, each of which is without the rest. Nor do indivisible parts in a thing continued, follow one another as in rank or row: for so there should come nothing of the same kind between: but between any indivisibles, there comes somwhat else of the same kind: for betwixt two points there is a line, in which there must needs be points.

Secondly, If a Line were made of Points, or a Surface of Lines, or a Body of Surfaces; a Line which did consist of ten points, would be longer then that which consists only of nine; and a Surface compounded of ten Lines should be broader then that which does consist of only nine; and a Body made up of ten Surfaces should be deeper then that which is made only of nine. But these should not so happen save for a point, a Line, a Surface. Therefore that point must have Longitude, that line Latitude, that Surface Crassitude or Depth. For in respect of that which is not long, another thing cannot be said to be longer; nor in respect of that which neither is broad nor hath breadth, can another thing be said to become broader; nor in respect of that which hath neither depth nor thickness, can a thing be said to be

thicker then another thing. All which things notwithstanding are manifestly falſ. *Thirdly* it would follow, that there are very many magnitudes, which cannot be divided into two equal portions; which is falſ: ſeeing, it is by the Mathematicians demonſtrated that every continued thing, may be divided into two equal halves, to which it hath a double proportion. For things conſiſting of unequal indiviſibles, cannot be divided into equal parts.

Fourthly, It would then follow, that the Diameter of a Quadrate were equal to its ſide, and a greater circle equal to a leſs, which has the ſame centre: which is abſurd. For if you draw lines from every point of one ſide of the Quadrate, as many as you can poſſibly, to the oppoſite ſide, they will all paſs through every point of the Diameter, nor will there be any point therein, through which they wil not paſs. For thoſe lines fil all the ſpace of the Quadrate. So if from the Centre you draw lines to all the parts of the greater Circle, they will all likewiſe paſs through the leſſer Circle, and therefore the leſs wil have as many points as the greater, and ſo they will be equal. And from theſe inſtances it appears, that a continued thing does not conſiſt of indiviſibles, and therefore that it may be divided into parts perpetually diviſible. For ſeeing it conſiſts of ſuch into ſuch it muſt needs be reſolved.

Yet we are here to obſerve, that a thing may be ſaid to be indiviſible two manner of waies: for a thing is either ſimply ſuch as having no parts: or reſpectively, which cannot be actually divided into ſuch parts, though it contain them, ſuch as are the ſmalleſt things Natural. And touching the former, is our Queſtion; *viz.* Whether a line, conſiſt of points; a Surface, of Lines; a Body, of Surfaces. Moreover we muſt know, that when it is ſaid a continued magnitude may be infinitly divided we are not to underſtand, that it has infinite parts actually or potentially, ſo as by continual dividing they may at length become infinite: but thus we muſt hold, that ſo many parts cannot be taken from a continued magnitude but more will remain. For we muſt not here admit of a real diviſion. For ſince all Quantity adheres in ſome Natural Body, and there are Natural Bodies of the ſmalleſt ſize imaginable, there will be found a quantity actually the ſmalleſt poſſible. But we muſt thus underſtand it; that there cannot ſo ſmal a Quantity be aſſigned, but that our underſtanding can conceive it diviſible into two parts, and again each of theſe into two, and ſo continually deſcending lower and lower. Again, this is to be obſerved, that it is rightly ſaid, that a continued Quantity may be infinitly divided: but it cannot rightly be ſaid that it may be divided into infinite parts. For if we ſay into infinite parts, we ſay not true: for as the continued Quantity is actually finite: ſo alſo its parts are actually finite: and are terminated by the bounds of the whol. But this is true, that a continued magnitude is apt to be divided infinitely, that is to ſay, in dividing you cannot come to any thing but what may be divided again. And hence it does not follow, that what is continued in magnitude has infinite parts. For every whol is eſtimated by ſuch parts, as have a certain magnitude: and ſuch in every continued thing are finite: but thoſe parts in reſpect of which a continued Quantity is ſaid to be infinitely diviſible are not actually of any determinate magnitude.

Hitherto has been ſhewed that a continued Quantity in a Body Natural, is not compounded of indiviſible parts, and therefore is infinitly diviſible, although it be never actually divided into infinite parts; ſeeing Natural things have determinate bounds of their greatneſs or ſmalneſs. Touching which, ſeeing there is ſome controverſie amongſt Authors, I ſhal ad ſomwhat to what has been ſaid, and make inquiſition into the greateſt and ſmalleſt Natural things. Wherein that I may proceed the better, I muſt premiſe ſome things.

In the *Firſt place*, Although the notions of *Greateſt* and Smalleſt, are transferred from Quantity to other things, as alſo Qualities and motions are; yet that in this place we ſpeak properly of Natural ſubſtances. For touching them the Queſtion is, whether they certain bounds and limits ſet to their Quantity. *Secondly*, That this Queſtion may have a manifold ſenſe: as a man may ask both whether there be in Nature a greateſt and ſmalleſt ſubſtance, then which now can be greater or ſmaller: and whether Nature have ſet bounds of Quantity, ſo that ſhe hath not of her ſelf power, to make things bigger or leſſer? Moreover, it may be further queſton'd, Firſt whether there be abſolutely the greateſt and ſmalleſt thing poſſible,

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in the Universe? Secondly, whether in every sort of Natural Bodies both simple and compound, and of Homogeneal mixt Bodies as wel as Heterogeneal, and of animate as wel as inanimate, there are certain and set bounds of Greatness and smalness? Thirdly we are to observe that the terms or bounds of greatness and smalness are twofold; some intrinsecal which things receive from their own Nature: others extrinsecal, which are by others externally prescribed to things. Fourthly, That the greatest and least are so termed Positively or Negatively. Positively that is the greatest thing, which is greater then all others, and to which nothing is equal; and the least contrarily Negatively, that is greatest, then which nothing is greater, though there be somwhat equal. And that is Negatively the least, than the which nothing is lesser, though there may be somwhat as little.

There is Actually in the whole universe and in every sort of natural things, somwhat greatest & somwhat least.

These things being premised, thus we conclude. I. In the whol Universe, and in every sort of Natural things, there is actually somthing which is greatest and somthing which is least. For unless there were somwhat greatest and somwhat least, in the whol world, and in every sort of things, either positively or Negatively: there might be a greater then any that is never so great, and a less then any that is never so smal, and so there should be actually in Nature an infinite multitude of things. But that that cannot be, shall be hereafter demonstrated. The same does also hereby appear; Seeing all accidents do follow the substantial Form: and every Natural Body, hath a Form actually determined: therefore every Natural Body must also have accidents determined and a limited Quantity. And, indeed, of all Bodies Heaven is the greatest, because it containes all things: but what the smalest thing is, we cannot peradventure determine. Howbeit *Aristotle* in his 5. *Book of the History of living Creatures Chap.* 32. Writes that in old Wax, as in wood, a white living Creature is bred, which of all Live-wights may be, counted the least, the name whereof is *Acari.*

II. In every sort of Live-things, there are intrinsecal bounds of greatness and smalness, without which Nature cannot produce nor conserve Living things: so that no Individual or Particular Creature of that sort, may be produced and conserved, which either exceeds that term of Magnitude, or fals short thereof. For examples sake, in case the greatest Height of a Man be four Cubits, the smallest one Cubit: there can no man be generated that shall prove higher then four Cubits, or lower then one Cubit: but all shall be either of four, or of three, or of two, or of one Cubit, or of some other measure betwixt four and one. And thus does *Aristotle* determine in his 1. *of Physicks, Chap.* 4. *Text* 36. *in the* 2. de Anima, *Chap.* 4. *Text* 41. *in the* 4. *de Gener. Animal, Chap.* 4. *in the* 7. *of Politicks, Chap.* 4. And Reason perswades the same. For since augmentation or growth is determinate: and quantity is acquired by augmentation, it self must therefore be determinate. And that Augmentation is definite, does hereby appear, because it is an action of the Augmenting faculty, which is determinate as all other faculties of the Form are: the instruments also are definite or determined. For the very Natural Heat is limited, and becomes every day more remiss, Yea, and is at last extinguished. Yea, and al the other. Instruments are also limited. Nor is experience against it. For we never heard of a Dog born as big as an Elephant, nor grown to that greatness, nor of an Elephant born no greater then a Puppy-Dog. Howbeit, hard it is to set down and observe the terms, in every species. For they have sundry variations, and more in one sort, then in another. Amongst Men there is a great diversity of Magnitude; a greater amongst Dogs; but not so great amongst Cats, and Birds and other Animals.

III. But the Elements have no determinate magnitude of themselves and intrinsecally, but from without. For the Elements of themselves, if they had matter enough; and there were no outward obstacle might be augmented indefinitely. For look how much greater Bulk the fire gains, by so much the more efficacy it has, the more it resists contraries, and turnes them into its own Nature. But their magnitude is limited by the things which contain them, and in respect of the *Materia Prima*, or first matter. For seeing the bulk of the first matter is finite, the Elements cannot be infinitely augmented.

IV. And Because the Elements do likewise change their Quantity, by Rarefaction and condensation; touching *that*, we are likewise to know: that of their own

nature, they are in this point limited. For they cannot be condenſed or rarefied, after every ſort and manner, without being corrupted. And experience does witneſs, that the earth is never ſo rarefied as the fire, nor the fire ſo condenſed as the Earth. Yea and when the Air is too much condenſed it is turn'd into water; and the water being too much rarefied is changed into Air.

V. Touching mixt things without life, which exiſt by themſelves, and are homogeneal, we are to judg the ſame in this point, as of Elements: and of things Heterogeneal the ſame as of living things.

VI. Finally, as concerning the Parts which are in the whol, thus we are to hold. If they are heterogeneal, they have determinate Limits of their greatneſs and ſmalneſs, inaſmuch as they are parts and Inſtruments of living things, which have a certain magnitude. But if they be homogeneal, there cannot be aſſigned a ſmalleſt, nor are they contained in any ſet limit of ſmalneſs. For ſeeing the Form of Fire, has the ſame reſpect in all its parts, and that it is extended according to the extenſion of the matter: after the ſame manner as there cannot be aſſigned the ſmalleſt inexiſtent Quantity; ſeeing every continued thing is infinitly diviſible: ſo there cannot be aſſigned any portion of fire, than which there is not a ſmaller in the ſame fire.

Whether there is any thing infinite in nature?

And ſo much may ſuffice to have been ſaid of Quantity; we are now to treat *de finito et infinito*: touching that which is finite, and that which is infinite. For theſe are proper adjuncts of Quantity: and they are likewiſe adjuncts of motion and time; ſeeing any and every of theſe is either finite or infinite. And in the firſt place, let us conſider whether there be any thing infinite in nature. And although there be ſundry ſignifications of this term Infinite: yet the chief ſpeech in this place, is concerning that which is Infinite in Quantity, and indeed of that which is actually infinite; and the Queſtion is, whether there be actually in nature any thing, which is infinite, either in magnitude or in number: or whether there be any natural thing, whereof when you have taken never ſo much in Quantity, you may ſtil take more, which is the definition of that which infinite. Now it is by the Phyloſopher rightly affirmed, that there is no ſuch thing in nature, for theſe Reaſons. For that, in general there can be nothing infinite, is from hence aparent; inaſmuch as all things produced by and depending upon another, are defined and circumſcribed by their own bounds and limits, nor can they by any means poſſible be infinite, But of the ſorts of things, it may alſo eaſily be proved, that there is no infinite multitude. For ſeeing one ſort does alwaies exceed another in perfection, if the ſorts of things were infinite, the world would be infinitely perfect, and would have in it infinite degrees of perfection: which is a thing Impoſſible. For every thing produced by another, and depending upon another, has a participated and therfore a finite perfection. But the world is produced by God and depends upon him. Therfore it has a participated and finite perfection, and is ſeparated from God in perfection, from whom it has received its perfection; and therefore, it is neither infinite, nor does it contain infinite ſorts of things.

Nor is there any thing infinite in Magnitude. For, in the firſt place, if there were a Body infinite in magnitude, there could be no other in the world but that; for ſeeing it would require an infinite place and would fil the Univerſe, it would leave no room for any other body. Moreover, every thing that hath quantity, hath neceſſarily figure. But that which is infinite can have no figure. Moreover it muſt conſiſt of all its parts either finite, or infinite, or of one infinite and the reſt finite. But none of theſe is poſſible. For that which is infinite cannot ariſe out of finite parts. Nor can the ſecond or third hold, for one infinite would fil all place and dimenſion, and would leave no place for the reſt of the parts: and if it ſhould have a Quality contrary to the reſt, it would turn all the reſt into its own nature.

And as we deny that there is any thing actually infinite, ſo we grant there is ſomwhat potentially infinite. And firſt in the continued Quantity, which is in a poſſibility of infinite diviſion, as was ſaid before: and ſecondly in number, which may be infinitely augmented. For there cannot be imagined ſo great a number, but that more may be added thereunto. Finally in time and motion, which are ſucceſſively infinite. But concerning that which is Infinite, I ſhal ſay no more, only conclude with that ſaying of *Piccollimineus* in his 1 *Book of common Affections of*

natural

natural Bodies, Chap. 3. That which is Infinite, as Infinite is unknown, and whileſt we know that which is infinite, we know that which cannot be known.

Chap. 6. *Of the Qualities in general.*

AFter Quantity *Quality* ought of right to follow, and we muſt ſay ſomwhat of the Phyſical Qualities in General. For as all natural Bodies have Quantity by reaſon of their matter: ſo in regard of their Forms they have Qualities. Now Quality thus conſidered in general, and as it belongs to all natural Bodies, is an adjunct of a natural Body, flowing from the form thereof, by which the form is efficacious, and a natural Body apt to do or ſuffer. For the forms of natural Bodies do not act nor work immediately, like God, but by the Mediation of Accidents and Qualities. And though the form be the primary Principle of Operations, and the Qualities are the immediate and next principle of the Operations, yet are they leſs principal, and only Inſtrumental. And the forms in their actings do uſe the Qualities as Inſtruments: but the Operation of the Qualities ſprings from the virtue of the Forms. And ſo becauſe nothing is idle in nature, but every natural Body acts, therefore every narural Body muſt alſo be furniſhed with its Qualities,

Quality what?

Now theſe Qualities are divided in reſpect of our knowledg into *Manifeſt* and *Occult*. The manifeſt are thoſe, which eaſily evidently and immediately, are known to, and judged by the Senſes. So light in the Stars, and Heavineſs and Lightneſs, being firſt Qualities, are manifeſtly obvious to the Sences. But occult or hidden Qualities are thoſe, which are not immediately known to the Sences, but their force is perceived mediately by the Effect, but their power of acting is unknown. So we ſee the Load-ſtone draw the Iron, but that power of drawing is to us hidden and not perceived by the Sences.

Qualities divided.

So there are many Influences of the Heavens which we know by their Effects upon theſe lower Bodies, but cannot by our Sences perceive them.

Now from the Qualities of natural things ariſe their conſent and diſſent, and things like have a mutual appetite one to another, contraries have an averſneſs one from anorher. Hence fire is eaſily united to fire, fat things to fat things; but fire ſhuns water, and fat things ſhun fire. And this is the manifeſt conſent and diſſent of Natural things.

But from the hidden qualities there ariſe Sympathy and Antipathy ſo called; when natural things are carried one to another by an hidden Love; or have a natural abhorrency one from another, as ſome cannot endure a Cat to be preſent, no not ſo much as to look upon the Cat, and others have the like abhorrency from other things. And becauſe this ſame hidden action is moſt conſpicuous in a Load-ſtone, other ſuch like Actions are therefore termed magnetical.

But of the ſeveral ſorts of Qualities, we ſhall hereafter treat in their proper places.

Chap. 7. *Touching Place.*

THat which is commonly ſaid of Time; *We live in time and yet we know not what time is*, may be as truly ſaid of Place: we are in Place, yet are ignorant what Place is. For the Queſtion about the nature of Place is ſo intricate, that the moſt acute Phyloſophers are herein at a ſtand, while the Queſtion is, Whether Place be the ſurface or outmoſt bounds of the Body containing: or a ſpace equal to the Body placed,

Both Opinions have patrons and defeuders of no mean rank. For the firſt is the opinion of *Ariſtotle* himſelf, and the moſt of his Interpreters: the latter was famous in *Ariſtotles* time and was maintained by the Stoicks, the Academicks and by *Galen*; and by *Phyloponus* amongſt the ancient Peripeticks; and amongſt late Writers, by *Julius Cæſar Scaliger* and other renowned Men.

And though I do not take upon me to compoſe ſo great a controverſie betwixt ſuch famous men, nor think that it is fitting to deſert the Prince of Phyloſophers, unleſs

whether Place be a Surface?

unleſs upon a very weighty occaſion: yet ſeeing the opinion of *Ariſtotle* is laden with very great difficulties, in the mean while, til ſome body ſhal anſwer what is brought againſt his opinion (for I beleeve no man has yet given a ſolid anſwer thereto) I muſt take the adverſe ſide: eſpecially ſince it is wel known that the very Interpreters of *Ariſtotle* have confeſſed, that the other opinion is not improbable, nor has been by any ſufficiently confuted, and that there is no demonſtrative Argument to the contrary; and that the opinion of *Ariſtotle*, is only probable, but not neceſſary: and it is very wel known, that moſt men have been moved by Authority rather than Reaſon to defend the opinion of *Ariſtotle*: which one man, *viz.* *Didacus Maſius* does plainly confeſs, when in his Commentaries upon the 5. *Chap.* of the 4. *Book of Phyſicks*, he thus writes: *But I* (ſaies he) *unleſs I were hindered by the Authority of* Ariſtotle *and* Thomas Aquinas, *ſhould moſt willingly imbrace that opinion concerning Space, which we may eaſily perceive, if diligently we ſhal weigh the foregoing Arguments and what has been ſaid touching the Nature thereof, that it is both more eaſie to be underſtood, and has fewer objections againſt it. But becauſe we muſt ſubmit our underſtandings to* Ariſtotle *and St.* Thomas, we are forced to confeſs, that Place is a Surface and not a Space, becauſe theſe moſt grave Phyloſophers, have ſo determined.

The Properties of Place.

But that I may not ſeem to have done any thing without reaſon, wherein I imitate *Ariſtotle*, I ſhal propound the chief proprieties of Place, and examine which do truly and properly belong thereto; that from thence it may appear, which of theſe opinions is moſt probable. *Ariſtotle* in the 4. *Book of his Phyſicks Chap.* 4. *Text* 30. tels us, That theſe are the properties of Place. 1. To contain the thing placed, or whoſe place it is. 2. To be no part of the thing contained, which property ſome joyn with the foregoing, thus: a place does ſo contain the thing placed, as to be no part thereof. 3. That the place be neither greater nor leſſer, than the thing placed. 4. That the place is ſeparable from the thing placed; or as ſome read it, that the place cannot be without ſome body, but may be without this body or that. 5. That all place is upwards or downwards. 6. That every body is naturally carried to its own place, and is diſpoſed to reſt therein. Howbeit, ſome joyn this with the fift. From other places, Authors gather more properties: for they ad, 7. That it is a property of Place to draw to it ſelf the thing placed: which they would draw out of the 4. *of his Phyſicks, Chap.* 1. *Text* 4. 8. That the place has a faculty of generating, conſerving, and perfecting the thing placed: which they draw from the 4. *of his Phyſicks ch.* 1. *Text* 4. *Chap.* 5. *Text* 48. 49. from the 4. *de Cælo Chap.* 3. *Text* 23, 24. from his 8. *de Hiſtoria Animalium Chap.* 28, 29. 9. That the place gives diſtinction and unity to local motion. 10. That Place is immovable, 4. Phyſ. Chap. 4. Text 41. 11. Out of *Pſellus* they draw this property: that a Place is neither aboliſhed, nor does periſh, though the things which are therein, may be aboliſhed.

And theſe are the chief Properties of Place which we meet with in Authors: betwixt which we muſt nevertheleſs diſtinguiſh. For, as to the firſt, ſecond, third, fourth, ninth, tenth, eleventh, they are ſimply neceſſary to a place, nor is there much doubt concerning them. As for the reſt, we muſt ſee in what ſence they may be admitted, and we muſt enquire, what agrees with a place in it ſelf and as it is a place, and what by accident: in which point there is no ſmal confuſion in Authors.

How place and Situation diffe r?

In the firſt place, that is to be noted, which *Scaliger* does hint, in his 3. *Book* de re Poetica *eſpecially in the* 120. *Chap.* nor has it been omitted by others; that we muſt diſtinguiſh betwixt a place ſimply ſo called, & as it is an affection of a Body natural in general; and between *Ubi* and *Situs*, which is not any place, but one affected with certain conditions, which they are nevertheleſs frequently accuſtomed to cal Place. Hence 'tis a common ſaying, that the place of light things is above, and of heavy things beneath: becauſe in the middle of the world there are qualities by which heavy things are amicably cheriſhed; and about Heaven there are qualities that cheriſh light things: which Qualities nevertheleſs do not neceſſarily belong unto the eſſence of place. For even the fire in the Bowels of the Earth is in a place, though not favorable thereunto. Hence alſo *Ariſtotle* in his 8. *B. de Hiſtoria Animalium, Chap.* 19. 28, 29. *Probleme* 15. *Section* 14. and *Pliny* every where, ſaies that the natures of plants and Animals are divers according to the variety of places wherein they are

and

aud that ſome places are convenient and others inconvenient.

Since therefore theſe are reckoned amongſt the proprieties of place: that every thing is carried to its place; that the place does allure and draw to it ſelf the thing placed; that the place has a power to generate, conſerve and perfect the thing placed therein: we muſt know, that all theſe properties do not agree to a place, as it is a place. For ſeeing a place as *Toletus* ſaies, is formally Quantity: it is not of the Eſſence thereof to be a Cauſe. For Magnitude as they ſay, is not the efficient of an accident; which *Scaliger* alſo intimates in his 5. *Exercitation, It is not true* (ſaies he) *that bodies are preſerved by their place, but by their form.* And if a Place as a Place, and therefore not a proper one, ſhould conſerve: the Elements would not ſeek to get out of that place into their proper place. The Elements therefore are not preſerved by their place; but by their *Ubi*. *Scaliger* in the *ſame Exercitation, Section* 5. But ſo far the Place is ſaid to preſerve the thing placed, inaſmuch as the body there placed, does conveniently receive the Qualities of the Heavens and Elements which are moſt agreeable thereunto: and inaſmuch as Qualities friendly to the thing placed, are in the Subject which is about the place.

And therefore, ſeeing in the ſearching out of the nature of things, that which is by it ſelf, muſt be carefully diſtinguiſhed from that which is by accident: we do here underſtand the term Place, not in the latter, but in the former Senſe: Nor do we allow of that ſaying, that only the Elements are in a Place. For we do not here ſeek after the Adjunct of ſome ſort of natural Bodies; but our Enquiry is, what *Place* is in it ſelf conſidered, and as it agrees to al natural bodies in general, and to al their ſorts as a proper adjuuct.

Whether the Properties of place do beſt agree to a Surface or a ſpace?

We are now in the next place to conſider, whether the genuine Properties of place do beſt agree to the Surface of a body containing, or to the Space commenſurate with the thing placed. And that we may begin with immobility; *that* is a moſt true propriety of Place, and by *Pererius* his confeſſion, though it make againſt himſelf, it is an eſſential Propriety thereof, even as riſibility or a diſpoſition to Laughter is an eſſential propriety of Mankind; and as *Ægidius Romanus* ſaies *Lib. 4. Phyſ. 1. 41. Sect. 7.* the very formal being of a place. To the aſſerting whereof, though there were no other Reaſon, this might ſuffice, that all Men whatſoever their opinion is concerning Place, do herein agree, that a Place muſt be immediable, and every one endeavors to accommodate this propriety to his Place. And verily he that takes away the immobility of Place, he takes away local motion and the diſtinction thereof. For that which is moved, of neceſſity leaves one place and goes into another: which could not be, if the place were moved with the thing.

From this Propriety therefore we conclude: ſeeing place is neceſſarily immovable, and the ſurface of a body containing is not immovable: that it is no Place. For ſuppoſe a Tower or a Pillar erected, or a Tree growing up in the Air, or ſuppoſe an Hill ina River, or in the Air, at every moment as the Wind blows and the River runs, their place wil be changed, which is againſt the Nature of Place. Yea and this great Abſurdity wil hence follow: that one and the ſame body, fixed in one and the ſame ſpace, quiet aud without motion, ſhall have every moment a new place, and ſo be in an innumerabe company of places.

In this Argument the maintainers of a Surface to be Place, are variouſly perplexed, as we may ſee in *Pererius* Book 11. Phyſ. Chap. 2, 3. and *Tolet.* Book 4. Phyſ. Queſt. 5. And *Pererius* himſelf demonſtrates that the anſwers carefully ſought out by *Scotus* and *Aquinas* are not ſatisfactory. And it wil be worth our while to conſider whether he brings any thing more to the purpoſe, ſeeing many affirm that he has anſwered all Objections. Now this is the judgment of *Pererius*: Firſt, he ſaies the word Place is uſed in common and vulgar acceptation for ſcituation and poſition; and 'tis commonly ſaid a thing has this or that place, meaning that it is ſo or ſo ſcituated; and, therefore a thing may change its place two waies, either actively or paſſively: Actively, when it paſſes out of one place into another, leaving the place wherein it was before: Paſſively, when the thing remains immovable, but the place about it is changed. He ſuppoſes therefore, that a Tower, a Pillar, or Mountain, about which ever and anon the ſurface of the Air or Water is changed, are not properly in the ſame place: yet they remain in the ſame place, by place intending ſcituation: or they remain in the ſame place actively; becauſe

becauſe theſe bodies themſelves do not paſs from place to place: yet they remain not in the ſame place paſſively; becauſe the Surface of the Air and water compaſſing the ſaid bodies, does not remain the ſame in number, but is ever and anon changed. This is *Pererius* his defence, which whether it be not contrary to al Reaſon and ſenſe, let himſelf judg. But I would firſt have *Pererius* reconcile this propoſition which is in his 11.B. ch.3. p.615. The Surface of the Body containing, which is of the Eſſence of place, is not alwaies the ſame in number about the ſame thing placed but is ever and anon varied; with that, in his 1.ch.p 607. immobility is eſſential to place, becauſe it is an eſſential property thereof, as riſibility is of a Man, and becauſe immobility is uſed in the definition of Place, inſtead of an eſſential difference. Can Surface be of the eſſence of place, and yet not be immoveable which is an eſſential propriety of place? Again I grant, that the term place is frequently uſed for the Scituation and Poſition of a Natural Body, and allow ſuch a ſpeech be proper enough: Yea, and if ſo be a thing remains in the ſame Scituation, I aver againſt *Pererius*, that it remaines in the ſame place; for Scituation alwaies preſuppoſes place, and it ſignifies the relation of the thing placed to the place. And therefore Natural bodies when they change their place, do alſo change their Scituation. And it is, doubtles, a great Abſurdity to ſay, that a thing not moved with any local motion ſhould change its place. For a new place is gained only by local motion: and that which changes place, is locally moved, and by local motion, we are bronght to the knowledg of place, as may be ſeen in *Ariſtotle* 4. *Phyſic. Chap.* 4. *Text* 32. And therefore *Tolet* rightly ſaies: If I ſtir not, and the Surface about me be changed, it may not be granted that I am not ſtil in the ſame place. That is therefore a weak defence, which is made by diſtinguiſhing betwixt active mutation of place and paſſive. For ſeeing to change place actively, is for a body to be transferred out of one place into another; to change place paſſively muſt be, for the Place to come unto and be moved to the thing placed: then which, what is more abſurd? Nor is *Ant. Ruvius* more happy in his ſolution, Book, 4. *Phyſ. Queſt.* 3. who confeſſing, that this Argument is ſo difficult, that in regard of the difficulty thereof, Authors have been divided, as to the manner of attributing Immobility to place; and examining and rejecting the opinions of others, he is at laſt forced to confeſs ingenuouſly; that it is impoſſible that the whol Nature of Place, ſhould conſiſt in a Surface, and that *Place* ſhould be immoveable; ſince 'tis evident, that the ambient Surface is frequently varied, and that therefore place requires ſomwhat, in reſpect of which it may be immoveable. And at length he is fain to fly to this, that Particular places, are therefore immoveable, becauſe they are parts of total place, or parts of that whol ſpace, real or imaginary, which is comprehended under the compaſs of the Skies. Whereby to ſay the truth, he ſo leaves *Ariſtotle*, as to joyn with them that ſay place is that ſpace, which every Body fils.

Another propriety of place, is to be equal to the thing placed. But the Surface is not equal the to thing placed; and therefore it is not the place. For a Surface hath only two dimenſions, but a Body three. Nor does *Pererius* his anſwer remove the difficulty: *viz.* That the place is equal to the thing placed, becauſe the convex Surface of the thing placed, and the hollow Surface of the thing containing are equal. For the Queſtion is not about the Quality of the Surfaces of a thing containing and a thing contained: but touching place and the thing placed. Now Bodies are placed, and not Surfaces. And therefore it is neceſſary, that a place, be not only equal to the Surface of the thing placed, but to al the dimenſions thereof: for otherwiſe the place ſhould not be equal to the thing placed. For a Line is not ſaid to be equal to a Surface, nor a ſurface to a Body; but a Line to a Line, a Surface to a Surface, and a Body to a Body.

A ſurface does not agree to al Bodies.

I ſhall not compare any more proprieties of a place with a Surface. For what hath been already ſaid, is more then thoſe can anſwer, who wil have place to be a Surface. Yet one thing I wil add. *Place* is a common Adjunct of al Natural Bodies, and ought to agree to all. But the Surface of a Body containing, does not agree to all Bodies. Therefore it is no place. For the Higheſt Heaven, hath no Surface of any Body to compaſs the ſame about: whereas it is nevertheleſs a Body, and is locally moved; and therefore requires a place. For whereas ſome think it is no abſurdity to ſay, that the higheſt Heaven is in no place, nor that every Natural Body hath a place: this ſeems unreaſonable. For that every Body

The higheſt Heaven is in a place.

is in a place, and that a Body cannot be without a place nor a place without a Body, is the Assertion of the graveſt Phyloſophers *Avenroes*, *Johannes Grammaticus*, *Porphyrius*, *Marſilius Ficinus*, and very many more both antient and late Authors. Nor does *Ariſtotle* ſeem to diſſent in this point, in the 4. *Phyſ. C.* 1 *Text* 6. *and* 1. *de Cælo, Ch.* 7. *T.* 69. And that aſſertion is not void of reaſon in the 4. *Phyſ. C.* 7. *T.* 1. *Every thing that is, is ſomwhere. and that which is not, is no where, and that which is no where, is not.* Natural Bodies, are real beings, and therefore they are ſomwhere. Now there are three manner of waies, whereby a thing may be ſomwhere, Repletively, Definitively, Circumſcriptively, or Locally. But Natural Bodies cannot Naturally be ſaid to be any where in the two firſt manners. For it belongs only to God to be Repletively any where: who as *Damaſcrin* truly writes in Book 1 Ch. 16. *is totally every where, totally in all things, and totally above all things.* Or as *Scaliger* in his 1. *de Plantis*; *who is by all things, above all things, in all things, before all things, after all things, High, Glorious, Immenſe, Incomparable, Incomprehenſible.* And to be any where definitively, is ſaid of Angels. And therefore Naturally bodies as ſuch, where ever they are ſaid to be, they are ſaid to be there Locally: and by Reaſon of their Circumſcript and Determinate dimenſions, they are in a Circumſcribed and Determinate ſpace. Hence *Du-Rand* ſaies wel in 4 *Sect. Diſtinct.* 44. *Queſt.* 6. *In this reſpect only a place is poſſeſt by the thing placed; becauſe the thing placed hath within the place, the diſtention of its parts. Since therefore this is eſſential to the thing placed, as it has Quantity, it is impoſſible the thing placed ſhould be in the place, and not take the ſame up.* And a little after: *If a Body be locally in a place, it cannot be, but it muſt take the place up: becauſe to take a place up, is to have in the place parts diſtant in poſition one from another and from all other Quantity: and that is nothing elſe, but to have Quantity.* Alſo there is a moſt elegant place to be ſeen in *Scaligers* 56. *Exercitation, Sect.* 6. wherein he ſhews, how the place is neceſſary to the thing placed. And in very deed, motion does ſufficiently teach, that the Heaven is in a place. For ſeeing every thing that is moved, is moved in its place, by local motion: and the Heaven is moved with local motion; we muſt by no means deny that it is in a place. Nor can local motion be imagined without a place, Yea verily, though the Heaven were without motion; yet the Heaven of its own Nature is in a place. For ſeeing place belongs to bodies not only becauſe of their motion, but that Natural Bodies are in place when they ſtir not; what ever you will aſſigne to be the cauſe why Natural Bodies are in place, it wil be found alſo in the Heaven: ſeeing it is a Natural Body.

God is preſent repletively.

Angels definitively

Bodies Natural Circumſcriptively or locally.

And whereas the Authority of *Ariſtotle* is objected, who in the 5. of his Phyſicks Chap. 5, Text 43. delivers this rule of knowing what Bodies are in a place and what not; *viz.* That Body is in a place. without which there is another Body that containes it: but that is not, without which there is none: this Authority does not hinder us at al. For *Ariſtotle* did build this rule upon his preſuppoſed definition of place; which definition falling, this rule fals: and withal the argument drawn therefrom. *viz.* That the Heaven is not in a place; becauſe place is the Surface of a Body containing: but without the Heavens there is no Body. For here the queſtion is beg'd: and it is more doubted whether place be a Surface, then whether the Heaven be in a place.

Seeing therefore, for theſe and many other Reaſons, that Opinion which makes place to be the Surface of a Body containing, cannot poſſibly ſtand: and by confeſſion of all Peripateticks, ſuch a thing as place there is, and it is diſtinct from the thing placed; I do aver, that a place is all that place long, broad, and deep, which the Body placed does Occupy and this ſpace is a thing different from the Bodies themſelves. For though you ſhould imagine al the Bodies in the univerſe to be removed, there would remaine a ſpace, long, broad, and deep; which nevertheleſs, is not at any time actually without Bodies: but the whol Univerſe fils this whol ſpace, and every part of the Univerſe challenges a part of the whol ſpace, equal to it ſelf.

Place is a ſpace not a ſurface.

Now that there is ſuch a ſpace is apparent out of the 4. of Phyſicks, Text 3. and the change of things out of one place into another ſhews as much. For there where Water now is, *viz.* In the Veſſel, when that is powred out there will be Air, or ſome other Body of equal dimenſions wil poſſeſs the ſame place. Nor does this happen only in reſpect of Surface. For unleſs a Veſſel be emptied according to al

whether there is ſuch a ſpace.

dimensions; another body cannot go into it; and the thing placed fils its place according to the three dimensions. Let there be two Vessels of equal Magnitude and Capacity, in respect of their concave surface; and fil the one which shal have nothing in it but Air, with Water: and afterward pour the same water into the other, in the middest whereof a stone shal hang by a thred; the water will not all be contained, by a vessel of the same capacity and surface. What is the cause hereof? If a surface be place, what is the reason, that, seeing there are in these two Vessels equal surfaces, and consequently equal places, they do not receive a Body placed of the same size? Namely, because a place is to be defined and estimated not according to the surface, but the whol space and profundity, according to which the thing is placed. And that two bodies cannot be together, is not therefore, because of the surface of the Body containing, but because each body requires a peculiar space for it self to exist in.

The proprieties of place agree with space

And that this space is place, does hereby also appear, in that all the genuine proprieties of place do agree thereunto; and by this opinion, those great difficulties are avoided, which vex other opinions. For the space containes the thing placed therein, and is equal thereunto: and is never without one body or other; but it may be without this Body or that: it is immoveable, nor when any Body is removed, does the space wherein it was move with it: but the Body passes out of one part of this space into another. Also by this opinion, that most difficult Question, in the answering whereof, one side is much puzzled as may be seen in *Pererius B. 11. Ch. 8. Tolet B. 4 Phys. Quest. 7. Colleg. Conimbr. Book, 4. Phys. Ch. 5. Qu. 2. Art. 12. viz.* How the uppermost Heaven is in place, may easily be answered. For it

The Heaven is in its space.

is in its space which it occupies, as *Scaliger* rightly saies in his 5. *Exercitation, Sect.* 3.

what this space is?

Now what for a thing this space is, is not very easie to determine. Yet we must not therefore deny that there is such a thing. For these are distinct Questions, whether a thing be and what it is, And if we should deny there were any thing but that the Nature whereof is perfectly known to us: we must deny against manifest reason the beings of many things, because their Essence is hid from us. Howbeit, when they who deny the uppermost Heaven to be in a place, shal explain what that same *Ubi* is, in which the upmost Heaven exists and is moved: it will be easie to explain what this space is. Or let them tel us, what is the Essence of the first matter, and we shall with the same ease unfold the Nature of space. For if from a Natural Body I remove in my thoughts all the form, and all the adjuncts proceeding therefrom, as *Aristotle* himself in the 7. of his *Metaphysicks, Ch.* 3. *Text* 7. Describes it by the negation of all things: what I pray you will there remain? And shall we therefore, because we cannot sufficiently understand the Essence thereof, and can only comprehend it by a bastard kind of reasoning, cal it only an imaginary kind of thing? By no means. Even so, though our mind cannot conceive space, save by the denial of al Bodies: it does not therefore follow that it is nothing, or nothing different from the Body. For if this and this and that and that Body, may be removed from this space; doubtless all these Bodies, wil be different from this space, and the Space from the Bodies.

Yet I shal produce what Authors think therof. *Proclus* held this space to be a body animate, indivisible, immovable, immaterial. Others wil have this space to be nothing real, but of it self an emptyness, or privation of a Body, which yet it can receive. Others say, this space is an accident, *viz.* A Quantity, long broad and deep: not as *Epicurus*, existing by it self without any Body, but alwaies conjoyned with some Body. *Jordanus Brunus Nolanus*, takes it to be a fift kind of Cause. Which seems to have been an old opinion. For they relate from *Albertus Magnus*, that the Peripateticks did reckon place amongst the Principles of Nature: from whose opinion, *Franciscus Patricius*, seems not to differ, in his *Book de Spatio Physico.*

Among these opinions, because the three last have renowned Men for their Authors, I am minded to propound them according to their Authors intents. Not but that I know the Objections which those opinions also are liable unto; seeing it is much easier to overthrow *Aristotles* opinion of place, then to tel what space is: but to the intent that the diligent searchers of Nature, may have hereby an occasion to think of the matter. For as *Aristotle* wisely writes in the 2. *of his Metaphysicks Ch.* 1. *'For we are not only bound to thank them that have so writ as to satisfie us with their opinions, but them also who have spoken but superficially, for even these men also advantage*

tage us by affording matter to exercise our wits. And as *Scaliger* saies well, in *his first Book of Plants, A studious Person should pass nothing over, which may offer it self as an occasion of fuller contemplation.*

Julius Cæsar Scaliger therefore, in his 5. *Exercitation Sect.* 9. saies, that th s Space is a Vacuity filled with Bodies, or a *Vacuum* wherein is a Body, whose Nature is such, that when one Body gives place to another, there is a *Vacuum* or Empty space made, that the other Body may come in as Privation is a Vacuity of the Form to be introduced: and nevertheless is by *Aristotle* placed amongst the Principles of Nature. For as *Epicurus*, in *his Epistle to* Herodotus *in* Diogenes Laertius, *writes*; If *that were not, which we call emptyness or space, Natural Bodies would no have where to be, nor would any thing be moved, as now we see things are moved.*

Now the last opinion save one *Phyloponus* did long ago stifly maintain, and some even in this Age do account it no absurdity. Nor do they conceive, that which is objected against this opinion, much to hinder the same: *viz.* if space it self be long, broad and deep, and another body should be placed therein, there would be penetration of dimensions. For two Bodies are not hindred to be in one place, in respect of Quantity alone; for so a Body of the Predicament of substance could not be with a Body of the Predicament of Quantity; whereas nevertheless these two are one and the same in number and subject; but beceause of the corporeal matter. And we must difference a Body extended and measured out, from the extension and measurement it self: whereof the former is a corporeal substance, the latter an accident: both which are nevertheless termed a body, by reason of that penury of words in this Case. Hence *Johannes Grammaticus* himself saies, that *a Body is not a threefold dimension, but that substance to which the said dimension is inherent as in a subject.* Nor does any remarkable absurdity follow from this opinion, *viz.* that an accident should pass out of one subject into another. For that passage only of a Form or adjunct out of one subject into another is impossible, whereby an accident or Form being one in number, does leave its whole subject, and pass into another: but if a substantial or accidental Form, does not go out of its whol subject, but remain therein, it is not absurd that it should go out of one part into another. Therefore every dimension may receive any Body, as one part of the dimension of the whol Universe, may contain also some part of the Universe in it. *What a Body is?*

Finally, Neither does that follow from this opinion, that there can be places actually infinite, or that a place can have a place, or that a place, can change its place, as it is in the 4. *of Physicks Chap.* 4. *Text* 37. For the parts of water are in water, as in their whol, and in space as in their place: which if they are finite, they have finite Spaces answerable, if infinite, they have infinite. Moreover since all the water changes place, the parts also of the water change place: yet place does not change place, nor is there a place of place. But as the whol and parts are transferred: so also the whol and parts change place: but the space which is part of the Universal space, remaines immovable. For neither a River, or Heaven, or a Vessel, or any such thing is a place, but that space wherein a River, Heaven or a Vessel or any other thing is contained.

Didacus Masius out of *Philoponus* and other Defenders of Space, does thus describe the nature thereof. The nature thereof is a body: for it consists of three dimensions, Longitude, Latitude, and Profundity: yet is it immaterial; because it has no matter nor form. For it ought to penetrate the thing placed, according to all its dimensions: but if it were material it could not penetrate. And therefore it is also indivisible; because from it no parts can be taken away. For division can only have place in such things as consist of matter: and moreover it is separated from the Bodies placed therein. For the same space in number which contains the Wine in the Flagon, the same receives Air, and when that is gone Water or some other Liquor. And therefore it receives not its individual nature from the Bodies, but of the bodies within whose sides it is contained, as the space in the Flagon from the Flagon; that in the Air from the Air. Moreover it is affected with no qualities; because it is neither white, nor black, nor hot, nor cold. And therefore it seems rather a Mathematical Body, separate from all sensible matter, then a Physical and natural body. Also it penetrates al bodies which it imbraces in its Lap, yet without division, as sweetness penetrates through the whol Body of the Milk

without dividing the same. For so it penetrates all bodies which it contains, as to fil them according to all their parts and dimensions, but not so as to divide them. Finally, there is one space in the whol universe and world, equal thereunto, which in divers parts receives divers Bodies. Nor when a Body is moved from place to place, does it carry its Space with it, but it passes out of one part of the Space into another, the space it self remaining wholly immovable.

Now *Franciscus Petricius* does thus conceive of Place. First, He saies it is a common Notion of all men; both that there is space, and that it is somwhat, seeing they have coyned these Terms, Dimension, Distance, Interval, Space: and that this content arose from their Sences. For al men do see that the Heaven is distant from the Earth, the East from the West, the Head from the Feet: and local motion and the migration of bodies out of one place into another, do teach the same thing. For where there was Water before, the water being Powred forth, Air enters into its place, and water again fils the place of Air.

Now he saies this Space was before all other things produced by God the great Work-master, inasmuch as all other things stood in need thereof, and without it they could not be. And whereas it is hard to know what Space is; he saies it is no wonder: for all the Qualities of Bodies whereby they incur into our senses, are later than the Bodies themselves: but Space is different from Bodies, yea and is before Bodies. For he makes Space the first of all worldly things, yea before the world it self. For if the world (saies he) should be destroied, and reduced to nothing that space in which the world is now, as in its place would remain quite empty. But if God will again make new Heavens and a new Earth, there is space beforehand, which can contain new Heavens and a new Earth. For its being now full does not belong to the Essence of Space (no more than the form belongs to the Essence of *materia prima*, though it be never without some form) but a plenitude accidental thereunto. For it happens by reason of the Bodies, which are al differrent therefrom. And he saies that Space is no otherwise a place, than as it affords a place for bodies to abide in, and of its own nature, before it is a place, it is a part of the universal space. And to that common objection, If Space be any thing, it is either a Substance or Accident, he answers: Space of it self, since it goes before the world, and is without the world, is no worldly thing, excepting that part thereof which contains the world, or which the world possesses with its Body but goes before al worldly things, whether bodily or not bodily, Substantial or not Substantial, and as all things are accidents to it, so is it to all things: and that this same space was unknown to the Authors of the Predicaments. And at last he defines Space to be an hypostatical extension, subsisting of it self, inherent in nothing. But if it must needs be of some predicament: if (saies he) that be a substance, which sustains other things, which subsists of it self, which is not inherent in any other thing, then Space is perfectly a Substance. For Space subsists of it self, it rests upon nothing, it needs nothing, to help it to be, or to sustain it, but it self sustains substances, and so enables them to be, and it supports all other things in nature. Also that it is the Original of Quantity, and that it has length, breadth, depth, and all dimensions: also that it is never moved in whol or in part, but whatsoever things are moved, are moved through this space, so that it self is wholly unmoved and unmovable. What he further writes at large see in his Book *de spacio Physico*. This one thing only I ad. The Quantity of a Body, is moved with the body it self whose Quantity it is: but as *Aristotle* himself saies, a body translated into the place of another, possesses the same place in number and nature, which that body into whose place it comes did before possess. For example sake, Water succeeds Air in the same numerical place; and so the Quantity of the Air and Water, are numerically different from the Quantity of the Space; since each remains in its own body, though it takes up and possesses another place. And seeing the Place is no part of the thing placed, nor any part (as has been shewed) of the ambient body, what other thing I pray you can we immagine, when both the Ambient Body, and the thing placed be removed, but a Space having three dimensions of Length, Breadth, Depth? And so much for this point. Let us conclude this hard discourse with an excellent saying of *Julius Cæsar Scaliger* in the 297. Exercitation. *'Tis easier for any man to oppose the Sayings and Opinions of wise men, then safely to commit his own Opinion to the judgment of others. Nor do I ever forget, but alwaies put my self in mind, to see, consider, remember, how weak the Ties of our minds are to pry into the secret Closets of Nature.*

CHAP

Chap. 8. *Concerning Time.*

A Peculiar adjunct of Essence, is that which Phylosophers cal Duration; that is, as they say, a continual tract of being, as *Scaliger* rightly has it, in his 350. *Exercitation Sect.* 7. For Duration is the measure of the being of every thing; and in every thing, these three follow one another Essence Existence, and Duration: which hold this order, that Essence is first, Existence next, and Duration last of al: Now Duration differs, as wel from the Essence as the Existence of a thing. And indeed from the Essence of a thing it differs really. For there are divers things which have the same Essence, and yet have different durations. But from the existence of a thing, Duration differs not really. For it is in a manner nothing else for a thing to dure, than to exist; and it is al one for a thing to be of a short or long existency, and for a thing to have a short or a long duration. And as the extension of Quantity is to Quantity (which nevertheless do not really differ) so is the Duration of Existency to Existency it self, yet there is some difference between them. For the Nature of existency, is only this, that a thing be out of its Causes, and actually somwhat; But Duration signifies the extention of a thing in this its being, and the continuation or abidance of the existency. Duration therefore properly belongs to existency, not to Quiddity, and it alwaies presupposes existency, without which it can neither be, nor be understood. Hence therefore Duration is not amiss defined, that it is the Extension of the Existence of a thing: or the abidance of a thing in its Essence.

How Duration differs from Essence & Existency?

Duration defined.

Now such as the Essence of things is, such is also its Measure: and as many manners as there are of a things abiding in its Essence, so many durations it has. As things therefore are threefold, so is there a threefold duration, or as some phrase it, a threefold measure of Duration; Time, Age, Eternity. For the measure of the duration of things, which are no waies infinite, and which have both a Beginning and End, is Time: The measure of the duration of things, which are partly finite, *viz.* in respect of their beginning, and partly infinite becaus they have no end, is called *Ævum*, Age or Æveternity. But Eternity is the measure of the duration, of that which is absolutely infinite, having neither Beginning nor End. But we are now to treat of Time.

A threefold Duration.

Al Men do frequently talk of Time, and are often mentioning To day, Yesterday to Morrow, and tell of daies, months and years; and in so doing they acknowledg that time is really somwhat: but what that is, very few can tel: and there have alwaies been sundry opinions about the nature of time, as may be seen in *Francisc. Piccollimineus* his *Book de Nat. com. Affect. ch.* 13. *Aristotle* reckons up three and refutes them in 4. *Phys. ch.* 10. For some would have time to be the motion of the Heavens; others the greatest of the celestial Spheres, others Motion simply considered. That wen ay therefore find out what Time is, we must know, that time may be two waies considered; First as the internal duration of a thing which has had beginning, and shal have end, and is successively continued, and to say all in a word, of a thing which is movable; Secondly for the measure of the said duration by some motion: and in this latter sense time is commonly understood by natural Phylosophers, who hold that time is not without motion, nor can be understood without motion. For then we understand Time, when we understand there has been motion, *and when we perceive no motion, we are ignorant that any time has passed*: as appears in such as sleep: For they when they are awaked, joyning the moment wherein they fel asleep with the moment of their waking, conceive no time to have passed between; which that Tale shews cited by *Aristotle* in Lib. 4. Phys. ch. 11. t. 97. Alike Story to which others relate, of three men at *Athens* who being drunk at a Festival, slept three daies together. For when one of them did awake the next night after that in which he first lay down, and saw the Stars stil shining, supposing that first night was not yet over, nor the Sun yet risen, he composed himself again to sleep, til at last awaking with his companions on the third day, he returned to the Feast, believing it was the next day following that night wherein he went drunk to bed. And a Story or Fable not unlike is related by *Pliny* in his 1 Book

of

Time is somwhat of Motion

of his *Natural History ch. 52. of Epimenides.* And dayly experience suggests the the like. Time therefore is not without motion, yea and somwhat thereof is motion. For *Time* and *Motion are perceived together.* For though we sit stil in the dark, and perceive no motion by any of our Sentes: if we conceive any in our minds, presently time presents it self therewith; and again, as often as we think of time, some motion does also therewith offer it self to our minds. Time therefore is somthing of Motion: which what it is, let us thus further search out.

Whatsoevever is moved, is moved from somwhat to somwhat, that is to say, from the term from which, to the term to which; so that between those two terms there lies a Magnitude. Now all Magnitude is continued. And therefore that motion which is made continually, through a continued magnitude, must it self be continued: and consequently Time also must be continued: for so great as is the motion, so great is the Time: and a longer motion is performed in a longer time, a shorter in a shorter. Moreover in magnitude, there is former and latter. For every magnitude is divisible into parts, which are so disposed, that some go before, others come after. For which cause, there is proportionably somwhat which comes before, and somwhat which goes after in motion: and those parts of a motion are first, by which the Movable is moved over the first parts of magnitude, and those latter, by which it is moved over the last. And for the same cause, also in time there must be a former and a latter; and so motion inasmuch as it has former and latter, agrees with time, so that by the distinction of former and latter in motion, we come to the knowledg of time. For when we consider two Instances or two extreams, wherewith motion is terminated, and understand that there is a middle space betwixt these two extreams, presently we conceive time. Contrariwise, when we conceive any thing under the notion of one Instant, and do not think of two Instances one former, the other latter: we perceive no time at all.

The Definition of Time.

From what has been said we therefore gather, that *Time is the number of Motion in respect of former and latter.* Which Definition that it may be more rightly understood and explained, these things are to be observed. In the first place, that

A twofold number.

Number is two-fold, the one *Nmubring* as two three &c. the other *Numbred* as two Stones, three Trees, four Men. The former, which is also called formal number, and wherewith we reckon, is one *Ens* or being of it self, *viz.* discreet Quantity, by cogitation abstracted from all matter, and perceptible by the mind: and it is common to all things, nor is multiplied according to the variety of things numbred. Or the word Number is taken two waies; First for Quantity discreet, or a multitude consisting of parts distinct one from another, or for any measure though continued. Now time is not a number in the first, but in the last sense; nor is time a number wherewith we count (seeing time is a continued Quantity, number a Quantity discreet) but a number counted or reckoned, *viz.* the parts of motion reckoned up, For we must not here pass over, that some distinguish betwixt a number numerable and numbred, and say that a number numerable are things, which have an aptitude to be numbred and distinguished by the understanding, although actually they are not numbred: but a number numbred are things, which are already actually numbred by somebody. And they say that time is a number numerable, or a motion, which may be distinguished, so as to have some parts going before, others coming after, although there were no man actually to number the same. From whence it appears, *that Time is a real thing.* For the aptitude to be numbred, or the numerability, does not depend upon the numberer, but is in the time and motion it self. A number numerable is again twofold: the one which Coheres to things which are really separate one from another: and such a number time is not: the other, consists of parts distinguished one from another, not really, but by our thoughts, as if a man should conceive some continued magnitude divided into certain parts; and such a number is time. For it is a flux and continual spinning out of the parts of motion, which perpetually follow one another.

A Measure twofold.

Moreover *this* also is to be observed in this place; that a Measure is twofold: one *formal* which is called *mensurata* measured, or *mensurabilis* mensurable; the other *Measuring* which is called active: which others express by saying that time is the number of motion actively or passively. Formal Measure, is that which when it

is

is in any subject, it makes it formally measurable; and thus every quantity, inherent in any Subject, makes the same to be formally measurable, and this measure is as it were an accident in that thing whose measure it is. But Measure measuring, is that which as a rule measures another thing. For this is alwaies without the thing which it numbers and measures.

Hence therfore a Question arises: *Whether Time be a measure or number with which being it self out of motion, we number moiton: or whether time be the measurable motion it self?* And although Authors say in both senses that time is a number or measure: yet primarily and principally, Time is a formal measure, and a number which is numbred. *Aristot. 1 Phys. c. 11. t. 102 and 12. t. 110.* For the nature of time does not depend thereupon, in that therewith we number other things; but herein it consists, in that it is a motion numbred according to former and latter. Moreover to be a measure (*viz.* measuring or active) is a thing respective: but time is a thing absolute. It is not therefore essential to time to be a measure measuring. For as the essence of an Ell-yard does not depend upon measuring, *viz.* that we should therewith measure Cloth or any other thing: but herein, in that it is a stick or other material of so many or so many Foot long, to which it afterward happens that we measure somwhat therewith: so the Essence of time consists herein, that it is a motion numbred, and distinguished according to former and latter, which afterward is followed by this adjunct, *viz.* to become the measure of other things. So by time, which is described by the conversion of the Heavens, we measure the motions of other things; and by the parts of time, hours, daies, months, years, we measure some whol motion or other.

Time is a Measure Measured.

Nor because time is a number; and a number does not exist without the Action of our mind: does it therefore follow, that time is only a feigned thing, and a notion of our Brains. For we must know that here are two things to be considered in time; First its *Essence*, which is a certain duration of the parts of motion; The other is its Affliction or Adjunct, which is numerability and mensurability. The former, *viz.* the absolute essence of time, does no waies depend upon our understanding, but it would remain though our understanding were gone. But mensurability does in some sort depend upon the operation of our mind. For seeing the parts of Time are either actually measured; or have an aptitude to be numbred: according to the Act and as they are actually numbred, they depend upon the operation of our mind, which being taken away, yet the mensurability would remain nevertheless. Nor when our Minds compares the parts of time past and future, joyns them, and reckons; does it fe gn any thing which is not, but finds out the parts which were before really in the motion. For as an Ell-yard, when we do not think thereof, has the Quantity of so many or so many Foot: yet the distinction and the marking them out, is the work of our mind and Art: so also Motion is of it self in nature, according to succession, without the operation of our minds; but the comparing of the parts going before and coming after, and the reckoning up the said parts, is the Action of our Mind.

Time is not a thing made.

In Time two things are considerable.

1. *Its Essence.*

2. *Affection.*

We must also in this place take notice: that although time be a reall thing, yet *it is no permanent thing*, which has its parts together actually present and permanent: but it is a *Successive* thing, which has no part actually existing, but all its parts in a continual flux and succession, so that when one is past another presently follows.

Time is no permanent thing

And we must also here enquire for better understanding of the definition: *what things motion it is which is meant in the said definition?* And we are to know, that chiefly and principally is understood the *Motion of Heaven*, which is of all others most known, most regular, uniform, and perpetual: but especially the motion of the first Movable or *Primum mobile*, of the Sun and the Moon, by whose Motions Daies, Nights, Months and Years are described. But the common People attribute no time to the motion of the rest of the Stars; because their motions are to the vulgar unknown. Howbeit Mathematicians, do not quite omit the same. And as the motion of Heaven is universally common to al Nations: even so al Nations use this Time. Howbeit, we must not say, that time is not at all in other Motions; for seeing there is former and lattter in every motion, and it may be accordingly numbred: in every motion, also there wil be time.

what that thing is whose motion is understood, in the definition of Time?

Our

Whether there be one time only or many?

Out of what hath been said another Question arises; *Whether there be one time or many.* To which that an answer may be given, we must know. First That one may here be said to be one in *Number* or in *Sort.* Secondly, That time as hath been said is *more* or *less* principal, *more* principal is of the heavens, *less* principal and secondary, of all other motions. Thirdly, That there are two things in time, as the Schoolmen speak, the one *Material* which is motion, the other *Formal* which is number. Hence we answer to the Question, That *the first and principal time, is but one in Number.* For as there is every where, and in all Nations but one motion of the Heaven: so is there but one time, depending thereupon. But if time be taken absolutely, for the number of every motion, it is not one in number: but formally indeed it is one in Sort, but materially it is many being Multiplied, according to the Multiplication of motion. For as seven trees and seven Horses, do not differ as they are seven, but as they are Horses and Trees: even so, what ever motions are together, do not differ as they are numbred according to former and latter, but as they are peculiar motions. Time therefore is formally one with all, for the Nature of present, past, and future is common to all, and those things which are distinguished according to these differences of time, they are also distinguished accord ng to time: and they which agree in any of these differences, they also agree in time although they differ otherwaies.

Whether in the definition of time Rest should be added?

And now there comes another Question; *Whether Rest should be added in the definition of time?* Because not only the motions of things, but also their rest, is numbred by time, and as wel rest as motion, is in time. But no evident reason perswades, that we should mention Quiet in the definition of time. For time is of it self the measure of motion, but of rest, by accident. For Rest because it hath not former and latter, cannot of it self be measured and numbred. For rest is measured by time, either as it is a privation of motion, for the measure of privation and habit is one and the same: and a thing is said to have rested so long a time, as it has not been moved, or as it should have been moved, if it had been moved all that while; or because the rest of one body is alwaies joyned with the motion of another, by means whereof, the rest is measured.

Whether time do really differ from motion?

And seeing time and motion do hang so one upon another, this Question must also be discussed: *Whether time do really differ from motion.* Now the sense of this Question must be first observed. For the Question is not concerning the time of the *Primum Mobile* or first moveable, compared with the motions of other Bodies. For hereof there is no Question, and all do grant, that the time of the motion of Heaven, differs really from the motion of other Bodies; seeing they are in several subjects; but the Question is, *Whether any time compared with that motion whose number and measure it is, do really differ therefrom.* And although others do think otherwise: yet theirs seems to be the truer opinion, who conceive that motion does not really differ from time. For time is nothing but motion numbred, according to priority and posteriority.

What we are to understand by priority.

Finally, This remaines to be explained in our definition: what is to be understood by fore and after or *Priority* and *Posteriority.* Touching which we are to take notice, that fore and after are not taken here absolutely, for a bare respect but as *added to the subject, and concretly for the parts of motion, including such a respect.* For priority and posteriority do in this place signifie nothing else, then the parts of motion numbred, according as they last, and one follows another.

The parts of time.

The Parts of time are *Past* and *Future:* which parts are both distinguished and coupled by the *present moment.* Yet *is the present moment no part of time*: As a point is no part of a Line. For so is *now* to time, as a point is to a Line: now that which is continued *is not made up of indivisible parts.*

Now no part of time.

Whether time generate and corrupt.

Lastly, Concerning time we must not omit to enquire *whether it be in the power of time to generate or corrupt things.* And although it is commonly said, that time does produce and perfect some things, and corrupt other some, and the Poets commonly say, Time consumes all things; Time is a devourer: Time is able to change all things, and that nothing is stonger then time, as may chiefly be seen in *Ovid* his 4. *de Tristibus, Eleg.* 6. Yet we breifly answer with *Scaliger* in his 352. *Exercitation*: That *Time as time hath no Force to effect any thing.* For seeing that it is Quantity,

tity, it acts nothing. And all those effects are to be ascribed to things, which are in or with Time. But Time it self is therefore said to corrupt or generate things, because the Application of Natural Agents for the corruption or Generation of any thing happens in time. *And so much for Time.*

Ævum.

Whereunto for Affinities sake, though they do not properly belong to this place, I think fit to ad a few things touching *Ævum* and *Eternity*. The term *Ævum*, although in that signification as it is distinguished from Eternity, and comes short thereof as having a beginning; it was not used by *Aristotle* nor the ancient Peripateticks and Platonists: Yet is it at this day very much used by School divines and other noble Phylosophers, who distinguish it both from Time and Eternity, taking it for such a duration as hath had a beginning, but shall have no end, which they attribute to Angels. Now touching this same *Evum* or *Æveternity* although there are sundry opinions of Authors: yet this shal suffice us to say in this place; that all the Nature of *Ævum* or *Æveternity*, does consist herein, that *it is the Measure of the duration of those things, which have a beginning but no end*: or as some will have it, *It is the duration of things which have no end but have had a beginning.* Now the way to measure this *Ævum* wherewith we are best acquainted, is by its coexistency, as they speak, and its relation to Time. For we say the Angels have dured 5661. years, which is the Time since the worlds Creation. Hence it is manifest, that *Ævum* differs from time and Eternity: from time in respect of the end which Time hath, but *Ævum* or *Æveternity* hath not; from Eternity, in respect of its beginning, which *Evum* hath, but Eternity hath not. Which *Leo Hebræus* expressed in his *third Dialogue of Love*: The *Æveternity* of Angels (saies he) is placed in the confines of Time and Eternity.

Eternity what it is

But Eternity, although there are other significations thereof: yet properly it signifies a *Duration which hath neither beginning nor End*, In which sense, we frequently meet with this definition thereof in *Boetius*: Eternity is a total and perfect possession of a boundless Life, all at once. For all the Essence of eternity consists in immutability or unchangeableness. For that which is *Eternal* neither begins, nor ends, nor is any way changed; but *is alwaies the same, and hath its whol Essence all at once.* Whence there results two proprieties of eternity, First, that it hath no bound, in respect of beginning or end: Secondly, that it is all at once. For though we attribute daies and years to etermity, yet we do it only for our better understandings sake. All which *Plotinus* considering, in his 3. *Ennead. Book* 9. *Ch.* 2. he saies, *Eternity is a life all together, alwaies wholly present, and not now one part and after another.* But these things belong not to this place. I conclude therefore with *Augustine*, in his 12. *B. de Civitate Dei, Ch.* 12. Nothing lasts long which hath once an end and al the bounded spaces of all Ages, if compared to boundless eternity, are not to be accounted smal, but nothing at all. Six hundred Millions of years or that sum multiplied by as many, so that there were no name for the product or total Sum, yet all compared to *Eternity* is nothing; and if the said sum be substracted from Eternity, not once or twice, but as often as any accountants are able to substract the same, yet should they never reach to the beginning of eternity, which hath no beginning.

Proprieties of Eternity.

Chap. 9. *Concerning Motion.*

WE come now to a remarkable Adjunct of Natural Bodies, *viz. Motion*, by the knowledg of which we are brought acquainted with the greatest part of the most abstruse things in Nature; and by the guidance whereof, in a manner al the knowledg of Natural things hath been found out. Now to Question whether there is any Motion, is the part only of a contentious and froward person: since it is discerned by al our sences. And therefore *Diogenes* did wel, who having heard the reasons of *Zeno*, whereby he endeavoured to prove that there was no motion, he judged them not worth the answering, but only Rose up and walked, intimating that in things subject to sence, we should believe our sences. Which *Aristotle* also approves in his 8. *Physic. Chap.* 3. *T.* 32. *to say that nothing moves, and to go about to prove it, omitting our sences, is weakness of Understanding.*

But as it is moſt known that there is motion: ſo what is the Nature thereof, is ſufficiently obſcure. And therefore, that we may the better underſtand *what motion is*, we will in the firſt place propound *Ariſtotle's* definition of motion, and diligently conſider the ſame: by which means we hope to attain to a good degree of knowledg touching the Nature of motion. Thus therefore *Ariſtotle* defines Motion in the 3. of his Phyſicks, Ch. 1. T. 16. *Motion is the Act of that thing which is in a poſſibility, in as much as it is in a poſſibility, or of that which is moveable, in as much as it is Moveable.*

Ariſtotle his definition of motion.

In this definition firſt we muſt diligently conſider the word *Entelecheia* (tranſlated Act) which as it is moſt uſual in *Ariſtotle*, and every where to be fonnd in his works; ſo is the ſignification thereof not ſo wel known, and many have taken pains to find out the true meaning thereof: ſo that it is reported of *Hermolaus Barbarus* a very learned Man, that having once attained to ſpeak with a ſpirit, he deſired nothing elſe of him, but that he would expound what the word *Entelecheia* in *Ariſtotle*, did ſignifie.

Endelecheia and Entelecheia differ

In the firſt place, we are to note that the words *Endelecheia* and *Entelecheia* are different: although ſome do confound them, wherein they are to blame. For as theſe words do herein differ, that *Endelecheia* is more ancient, being uſed by *Menander* and *Plato* in his *Timæus*, Yea, and commonly by the people of *Greece*; but *Enteletheia* is a new word, witneſs *Tully* in the 1. *of his Tuſculans Queſtions*, and by *Ariſtotle* either invented or frequently uſed; ſo they d ffer alſo in Derivation and Signification. For *Endelecheia* does ſignifie a continual and perpetual motion or agitation, ſo called from *en cai dein cai Helam to echomenon*, becauſe it is in the ſubject and draws and moves the ſame, as appears from that Greek proverb *Ranis endelechouſa coilainei petran*, the ſtil falling drop hollows the ſtone. From *Ariſtotle* in his 2. *de generat. & corrupt. Chap.* 10. and other Greek Authors.

Entelecheia what it is?

But *Entelecheia* is derived from *en* and *telos* or form *Enteles* and *Echein*, to have its end, to have perfection; and *Entelecheia* if you would render it word for word, is the having of perfection, or the poſſeſſion of perfection: and *Entelecheia* is alwaies in *Ariſtotle* oppoſed to poſſibility or aptitude, as may be ſeen in the 3. *of his Phyſick Ch.* 1. T. 2. in the 5. *of his Metaphyſicks Ch.* 2. and in his 2. *de Anima. Ch.* 1. T. 2. Out of which may be collected, what *Entelecheia* truly ſignifies. For ſeeing a thing is ſaid to be in a poſſibility to be ſomwhat, when as yet it is not that thing which poſſibly it may be: *Entelecheia* muſt ſignifie to be really and actually that which it is ſaid to be, and really to have attained to be ſuch a thing, and no longer to be in a potentiality thereunto: *and* Entelecheia *muſt be that which perfects and fils up the Poſſibility or Aptitude of a thing; and makes that the thing may now really and perfectly be ſaid to be that, which before it was ſaid to be only in way of poſſibility or Aptitude:* And to ſpeak all in ſhort *Entelecheia* is the filling up of the Potentiality or Aptitude of a thing.

This being the ſignification of this word (which though new to the dul multitude, yet was known to wiſe men to whom *Ariſtotle* wrote and not to pedants, as *Scaliger* in his 307. *Exercit. Sect.* 39. has it) it is cheifly attributed to the ſubſtantial Form, For it is the ſubſtance and perfection of a thing, and becauſe of it a thing is really that which it is ſaid to be. And indeed, as *Franc. Piccolhomineus* ſaies in his 4. *Ch. de Motu*, *Entelecheia* is applied, as well to formes free from matter as to ſuch as are joyned thereto: which opinion of his ſeems to be countenanced in the 3. *B. of Phyſicks Ch.* 7. *Text* 3. Howbeit *Zabarella* herein diſſents from him *in his Book de Mente hum. Ch.* 7. who denies ſubſtances ſevered from matter to be properly called *Entelecheias*: and he ſaies that only in one place in *Ariſtotle*, viz. 2. *Metaphyſ.* 1. 49. the ſupream or firſt intelligence is termed *Entelecheia*, and that not without Reaſon. The ſame word is alſo attributed to accidents or accidental Forms; ſeeing alſo becauſe of the things themſelves they are ſo called, and they fil that poſſibility and Aptitude which the things had to receive accidents. Yea, And as it appears out of *Ariſtotle* in his 2 *de Anima*, *Ch.* 1. T. 2. *Entelecheia* is not only attributed to forms, whether ſubſtantial or accidental, whence the operations proceed; but alſo to the operations proceeding from the forms. in a word *Entelecheia, ſignifies all that, by meanes of which every thing, is really that which it is ſaid to be.*

But

But for the word *Entelecheia*, *Aristotle* often uses the word *Energeia*, which signifies not only operation, as *Zabarel* conceives, who in his *Book de mente humana Ch.* 7. teaches that *Energeia* signifies only operation, and formes conjoyned with the matter, whose essence differs from operation as an accident, he denies to be called *Energies*; and he saies, among substantial Forms, it is only rightly attributed, to those that are free from matter. Howbeit this word is attributed as wel to Forms joyned with matter, as to those without it. For *Aristotle* in his 9. *Metaph. Ch.* 6. simply opposes to be in energy, unto being in potentiality or Aptitude, and in the same place he cals the substantial Form joyned to the matter *Energeia*: and up and down in the same Book, he cals the substantial Forms of things, *Energeias*, as may be seen, cheifly in the 8. *Chap.* which he also does in 8. *Metaph. c.* 2. And in the 4. *B. ch.* 2. *Energein* signifies not only to operate, but really to be. Also, that *Energeia* is used to *signifie the accidental Form*, appears from the 3. *of his Physicks*, *Ch.* 2. *T.* 15, and *Ch* 3. *T.* 18. but more evidently from the 20. *Metaph. Ch.* 8. where he thus writes: *Seeing every thing is divided into Act and Aptitude, I call the Act of that which was before only in power*, Energeia, *Motion.*

Energeia what it signifies & whether it differ from Entelecheia.

To these Greek words, the Latin word *Actus* does answer, which does not, in this place, signifie Action only; But that, *from which every thing is said to be what it is.* For as *Scaliger* saies in his 359. *Exercitation Sect.* 2. we must borrow ordinary words to signifie abstruse matters: which seem harsh to Novices, and ridiculous to curious Ciceronians. Now according to *Scaliger* in the same place, *An Act is that being, which wants nothing to make it be what it is, but has all its causes.*

Actus or Act what it means.

Now here in the definition of Motion *Entelecheia* is taken, neither for the perfect form, nor for the operation alone; but *for a certain imperfect Act.* For there is a twofold *Act*, one *perfect*, which when it comes, it expels al Aptitude or potentiality, and leaves none of it behind: another *imperfect*, with which there alwaies remains somwhat of possibility; which when it is taken away, the Act is also taken away; and such an Act is Motion. For seeing that is called moveable, which may be moved: motion is the fulfiling and perfecting of that possibility, in regard of which a thing is called moveable, and makes that it hath not only a possibility of being moved, but that it is now really moved, indeed and in truth. Howbeit this *Entelecheia* does not take away al possibility, but only so perfects the Body moveable, that it retaines yet the possibility of being more moved, until at length it come to the utmost term of motion, to which while it is moved, it must needs have the power of motion. For truly the thing moveable, while it is in the term from which, is not yet moved; but while it is in the term to which, it is moved no longer; but now it is moved, and ceases from motion. But then it is truly said to be moved, when it is now in the Act, in which before, when it was in the term from which, it was not, but only had a possibility of attaining the same; and when it yet tends to that further act, which in respect of the term from which, it hath not, but may attain. For if it had already the last term, it would be no longer moved thereunto. For which cause it is also said in the definition of Motion: that Motion is the *Act of that which is in possibility.* For whatsoever is moved, as may appear by the premises, is part in act and partly in possibility. In act, in respect of the Form and of that term which by motion it hath already gained, and actually possesses: in possibility, in respect of that which it hath not yet obtained, and for the sake whereof it is still moved. For examples sake: Water which is in heating, is said to be moved, that is to say altered. For it hath already some degrees of heat, and has the possibility of gaining yet more, and does likewise gain them by growing warmer: and when it has attained all the degrees, it is then termed hot water; but is not said any longer to grow hot, or to be altered and moved.

What Entelecheia signifies in the place. An act is twofold.

Motion is there fore neither a pure act, nor a pure possibility, *But a certain middle and imperfect act.* And in every motion are found these three things: *Some of the Form*, which is by motion already attained; a *power* of receiving that form more perfectly and in a greater measure; a *Flux* and Progress or Tendenay to the said Form. Finally *Aristotle* adds in the definition, *in as much as it is in possibility*, to signifie that motion is not made in respect of that Form and term, which the moveable thing hath already attained. For a thing is no longer moved for the sake of that, which it already possesses; but for the sake of that term which it has not yet attained, and which it has a power to obtain. From what hath been said,

Motion is an imperfect act.

'tis easie to gather wherein the Essence and formality of Motion does consist.

Two things in Motion. For seeing there are in every motion *two* things, one the form it self flowing; the other, the flux of the form: Motion formally, is neither simply a form, nor a form flowing, but a continual acquisition of Form, and the flux thereof, partly already acquired and partly to be acquired. For to be moved, is not to have the form; but to be moved, is to tend to the form.

To natural motion are required. Moreover, to all Physical or Natural motion, these things are required.

1 *A Mover.* I. *A Mover*: For every thing which is moved, is moved by some other thing. For it is impossible that the same thing in respect of the same form, should be in Act and in Possibility: But that which moves, or introduces any form, does actually possess the same; that which is moved has only a power to receive the form. And therefore it is not the same thing which moves and is moved. Howbeit touching this Axiome we must observe, that it is only to be understood of *material things and natural bodies compleat, and of the motion of the whol compound*; and that the intent of *Aristotle* in the 7. *Physick. cap.* 1. when he delivered this axiome was to deduce natural motion to one first Principle, and thereby to prove that there was one first mover, by which as by a first Principle, all bodies are moved: otherwise, unless this axiome be warily understood and explained, many difficulties arise, seeing not only Animals are moved by an internal force, but also the Elements by an inward principle are carried to their place, where not only the body of the Element is moved by its form to its place, but also the form it self tends to its place. See also beneath *Book* 2. *ch.* 3.

2 *A Movable.* II. *A movable* or *thing moved*, and hence every thing that naturally moves it self is divided into a part moving, and a part moved. Now that which moves must needs be with that which is moved, or that which primarily does move any thing, without the Intervention of any intermediate agent, ought to touch that thing which it moves, and to be very neer unto the same. For we cannot so much as imagine, how any thing can suffer from that, by which it is not touched, or how any thing can act upon that which it does not touch. For since operation follows the Essence of a thing: where the thing is not, there its operation cannot be. For though the first mover be absent from the thing moved in respect of its substance, yet is it joyned therwith, by the Virtue which it sends forth. And thus *the next mover and the thing moved, are alwaies together, and every action is caused by touching.* Now motion is in the thing moved. For the Act is in that thing, whose act it is. Yet is not the action of the mover different from the act of the thing moved, but there is one act of the Agent and the Patient. For it is one and the same thing which the mover produces by acting, and which is produced in the Patient by suffering. And *the Action of the mover and the passion of the moved are one only motion*, not really distinct one from another; but only *respectively*, viz. in as much as the same Act, does proceed from the mover as from its Principle, and is received by the Moved, as the Patient: which is wel expreſt by *Aristotle* in the 3. *Phys. ch.* 3. *t.* 22. *For to be the Action of this in that, and of that from this, differs respectively.* So that the same motion as it proceeds from the Agent, is an action, as it is received by the Patient, a Passion. And the heating of water by fire, is but one action: which as it proceeds from the Agent, *viz.* the fire, is called an Action, as it is received by the water, a Passion. And therefore Action and Passion are in one Subject. For seeing passion is in the Patient, and action really differs not from passion: the action must also needs be in the same Patient. Yet this must be observed that we spake here of a transient action: but not of an immanent action, which abides in the Agent.

The Action of the mover and the Passion of the moved are but one motion.

3 & 4 *Terms of motion.* III. *The Term from which.* IV. *The Term to which.* For seeing every motion is a kind of change; it must needs go from somwhat, which is called the term from which, to somwhat, which is called the term to which. And there are neither more nor less, than these two terms. For though one motion may have many terms to which: yet they are not the last & total, or they are not primarily intended and for themselves, or they are not intrinsecal. But in motion we are chiefly to regard the term to which. For that is it for the sake whereof the movable is moved, and from it the Unity, Distinction and Contrariety of Motion are chiefly taken. For seeing motion is a kind of continual progress from the term from which, to the term to which, and the term from which is rejected, and the term to which acquired: justly

ly therefore the motion receives its denomination and distinction from the term to which.

V. *Time*: For no motion is performed in an Instant, but *Successively and in Time*. For since motion is the Act of a Being in possibility, and has no abiding Essence: of necessity the thing moved, must be partly in act, and partly in possibility: and therefore motion must be successive. For if it were all together, it were all in Act, and the thing could no longer be said to be in motion, but already moved. 5 *Time.*

VI. *Continuity*, or Unity of Motion, in respect of time, and the term to which. For the Continuity and Succession of the Motion depends chiefly, upon the Term to which the motion is made; and the motion is said to be performed successively, because the Term to which the motion tends, is successively gained. But that a motion may be one in number, *three* things are requisite: one movable, one term to which; and one continued time. To which a fourth may be added, the Term from which. For one motion cannot proceed from divers Terms. 6 *Continuity*

What is the Nature of Motion has been explained hitherto, it remains that we now shew you what are the Sorts of Motions. Where in the first place you are to take notice, that there is a difference betwixt *mutation* and *motion*. *Metabole* or Mutation is of larger extent, and signifies every variation of a thing, whether the terms in respect of which the thing is varied, be positive and contrary, or contradictary: but *Kinesis* or Motion properly so called, is not of so large an extent, but is conversant betwixt terms (upon which, especially the term from which its nature chiefly depends) which are contrary, or if mediate, yet having the nature of contraries. *Motion & Mutation differ.*

Motion therefore *properly so called is conversant betwixt contraries.* Now we term such things in this place contraries, not only which do most of all differ under the same kind: but whatsoever positive terms, by the coming of one of which another is changed, whether it be in respect of contrary qualities, or according to intention, or according to extension. Whatsoever therefore ought to be reckoned for a term of motion, must have these two conditions. First that it have a contrary in such a manner as has been said; so that the motion must pass from one contrary as the Term *a quo* from which, unto the other contrary as the term *ad quem*, to which. Moreover, that must of necessity be attained, which terminates the motion of it self, and not without the change of the Subject, which is performed by real action and passion. *Motion is made betwixt contraries.*

From which may easily be gathered, that true motion is *only in three Predicaments*, viz. *Quantity*, *Quality*, and *Ubi* or Place; or that in respect of that thing to which the motion tends, it may be reduced to these three Predicaments. For both the forms of these Predicaments have contrariety, and positive oppolite terms; nor can their change happen without the change of the Subject. *Motions are only in Quantity, Quality & Place.*

But Generation and Corruption which are changes in the substance of a thing, are not properly Motions. For that Contrariety necessary to motion, is not found in substances. Moreover, since every thing which is moved is an actual Being; but that which is generated is no actual Being (for if it were already, there were no need that it should be generated) therefore *Generation cannot be a Motion.* Lastly, *Every motion is continued and performed in time*: but generation is not performed in time, but in a moment, and therefore also it cannot be a Motion. For substantial forms being indivisible and not capable of more or less, cannot be successively acquired and by piecemeal. *Generation and Corruption are not properly Motion.*

Howbeit we must here observe, that Generation and corruption are taken *two waies*, either only for the acquisition or loss of a substantial form, without precedent alteration: or for the introduction of a form, with alteration which went before the same. Generation and Corruption taken in the former Sense, are no motions, but are performed in an Instant: but in the latter sense they may be allowed for Motions. *A two fold Acception of Generation & Corruption.*

Moreover, this must not be omitted neither. That *Succession in motion is considered two waies*: Primarily and chiefly as was said before, *in respect of the form*, which seeing it may be intended and remitted, and has certain degrees, in respect of which it is capable of more and less, it therefore successively acquires those degrees, *viz.*, one before, another after. But since the substantial form has no such degrees, it cannot

cannot be intended, nor remitted, nor is it successively introduced, but in an instant and all at once. Afterward there is said to be a succession *in respect of the Subject*, which is movable: which succession others seem to call extension. For since a thing movable is divisible, and has some parts formore others hinder: and the mover acts first upon the formore parts and which are neerest it self, and afterwards upon the hinder and more remote: also in this manner we may grant that Generation is made successivly. But both these successions are considered, in motion properly so called: but the former holds more of the nature thereof: which being absent from Generation it cannot be called motion.

Moreover, it is evident, that there is no motion in *Relation*, *Action*, *Passion*, *When*, and *Habit*, the Predicaments so called. For those mutations which are made in them, do either not happen with the change of the subject, or not of themselves primarily, but consequently and by accident.

The sorts of Motion. *Motion* therefore *properly is only made out of one subject into another*: and there are three sorts thereof. In Quantity there is Augmentation and Diminution. For these two mutations have no common name. In Quality, there is Alteration. In Place, there is local motion from place to place.

Rest what it is. To Motion *Rest* is opposed, which is the *Privation of Motion in that thing, which is naturally apt to be moved*; and in as much as motion is made to attain rest, it may also be said to be the end and perfection of motion. So a body, when it has attained its natural magnitude, ceases growing.

Rest twofold. *Rest* is either *natural*, whose principle is internal, and to which the *movable* is naturally enclined: So the Earth is naturally moved to the Centre, and rests there. Or *Violent*, whose Principle is external, when a body is kept by force in a place not natural thereunto; as when a stone or clod of Earth, is hung up in the Air.

THE SECOND BOOK

Chap. 1. *Of the World.*

HItherto we have treated of a natural Body, as it is a General term, comprehending sundry sorts, and we have spoke of the common Principles and common adjuncts of a natural Body in general, without any consideration of the sorts: we are now to come to the *several sorts of natural Bodies*. And because the whol mass and heap of all Bodies natural, does make one total sum, which is called *the World*; before we treat of any sort of natural bodies, or of any part of the world, we must first speak of the whol, and explain what the world is, and what proprieties and adjuncts it has.

The sundry significations of the word Mundus That which is by the Greeks termed *Cosmos*, because of its absolute and perfect Elegancy and Ornament the Latins call *Mundus* for the same cause: which word because it signifies a thing which is absolute, perfect and comprehending in it many things orderly ranked, many things are so termed. *Marsilius Ficinus* on the 3. *Book of Plotin. Tnead* 1. makes two worlds, one intelligible, being the divine mind, the Pattern and Idea of this sensible world: the other sensible, *viz.* this which we behold, being the Image of the divine Pattern. Others do again divide these two worlds, and make more worlds. The first is the Archetype or Intelligible world, which is the divine mind or God himself, who contains in him the patterns and Ideas of all things: the second is the angelical world, made up of the multitudes of Angels rank'd in their Hierarchies: the third is the Elementary, which is made up of

of Heaven and the Elements: the fourth is the great world, which contains al created things, both corporeal and incorporeal: the fift, is the little world or *Microcosme*, which is Man.

We are in this place chiefly to treat of that world which consists of Heaven and Earth and the Bodies therein contained, and by another name is called *to pan*, the Universe becauſe it comprehends al natural bodies, & to which the term *Mundus* or World does chiefly belong and which in regard of its order was given it by *Pythagoras* as *Plutarch* saies in the 2. of his *de placit. Phyloſop. ch* 7. though we may doubt hereof, becauſe the word *Coſmos* is read up and down in the writings of *Hermes Triſmegiſtus*. For this universe is truly *Coſmos* or *Mundus*, that is to say adorned, orderly marſhalled, and beautiful. And therefore *Ocellus* inſcribed his Book of natural things *peri tou pantos*, *de univerſo*, of the Universe, and touching theſe names he thus writes. *I cal this whol world by the name of univerſe: For becauſe it is diſtinguiſhed and adorned with all things that are, therefore it has gained this name* Coſmos *and* Pan, *the world and Univerſe.*

And as there are ſundry ſignifications of the term world, ſo there are ſundry definitions or deſcriptions thereof, which *Franc. Piccollo nineus* has collected in his Book *de Mundo* ch. 2. But thoſe are of all other moſt pertinent and moſt fit for this place, which the Author of the *Book de Mundo* has in his 2. Chap. (for whether it be *Ariſtotle's* or *Theophraſtus's*, or of ſome other Author is a queſtion, of which ſee *Ludovicus Vives* upon *Auſtin de Civitate Dei Lib.* 4. *Chap.* 2. *Collegium Conimbricenſe* in the proeme to *Ariſtotles* Phyſicks queſt. 5. art. 4.) the firſt is this, *The world is a Fabrick framed of the Heaven and Earth and the Natures in them contained.* The ſecond is this, *The world is the Order and Diſpoſure of all things, which is preſerved by and through God*: which may thus I conceive be fitly joyned both in one. *The world is that ſame orderly Diſpoſure of all natural Bodies, proceeding from God and by him preſerved.*

The *Matter* therefore of the *world* are all natural Bodies, not only ſimple but alſo mixt; not only liveleſs, but alſo living: yea and univerſally, a natural and ſenſible Body, as *Ariſtotle* ſaies in his 7. *de Celo*, ch. 9. t. 98. And the world is compounded of the Heaven, the four Elements, mixt bodies, inanimate and animate, mettals, things dug out of the ground, Plants, and Animals or living Creatures. *The worlds matter.*

But what is the Form of the world is not ſo evident, and there are ſundry opinions thereabouts. For ſome ſay God is the Form of the world; others a ſoul common to the whol Univerſe; others, the Heaven; others, its Figure; others, Order. But among theſe opinions, two have at this time the preheminence: the one is that which attributes a certain ſoul to the world for its Form: the other is that which makes order to be the form of the world. That the world has a ſoul is an old opinion, approved by many moſt renowned men. It is countenanced by *Hermes Triſmegiſtus*, *Zoroaſter, and Orpheus*. So in his Book called *Nous pros Erme*, *All things* (ſaies he) *are ful of ſoul.* And in his Book *de Intellectione & ſenſu*, he attributes a proper Sence and Intelligence unto the world. *Pythagoras* held the ſame, with *Plato* and his Followers, who oft times cal the world a living Creature, and aſſign it a common ſoul, which every where through Land and Water, contains in it ſelf ſpiritual and quickening ſeeds; and of it ſelf ingenders, wherever corporeal ſeeds are wanting; and alſo cheriſhes the ſeeds left by Animals, and of a putrified Grape-kernel engenders a various, orderly and precious Vine; which wherever there wants a generator, and accidental qualities ſeem only the Cauſe of Generation, ſupplies the place of a generating Subſtance; as *Marſilius Ficinus* ſhews at large, *in his* 4. *Book of Platonick Theologue Ch.* 7. *Touching the form of the world ſundry Opinions.*

But the Peripetaticks like not of this Opinion For ſeeing no evident reaſon perſwades the ſame, nor is there any neceſſity that it ſhould be ſo; they neither attribute to the world any informing Subſtantial form, nor one common ſoul, nor do they think it fit to multiply things without great occaſion. For no Action does plainly appear in the whol world, as proceeding from any peculiar ſoul common to the whol world: but all operations do proceed from peculiar and diſtinct forms. And therefore ſince all parts of the world have their peculiar forms, there needs no common form to knit them together; ſeeing without it, the ſeveral forms can perform their own operations. Moreover, if there were one form informing the world, the other forms, muſt either be parts thereof, or be informed thereby; both

both which are absurd. They cannot be parts; for all formes are not univocal, and differ more then in kind, nor can they make up one whol: And one form in number, cannot constitute distinct things, such as Natural things are. For since the form gives unity as wel as being: all Natural things should be termed one rather then many. And that the other formes should be informed by this, is also many waies absurd. Nor is there any reason to beleeve that this form of the world, comes upon the other forms, just as the form of a living Creature comes upon the form of a mixt Body. For if this were so, it should be more excellent and more perfect then the rest of the forms: which the Platonists nevertheless, will not grant. For the Soul of the world does not include more and more excellent faculties, then the forms and Souls of all Natural Bodies.

And therefore the Peripateticks deny that the world is one, by the unity of a Form informing; and they attribute thereunto only an unity of order of those things, which proceeding from one principle, do tend unto the same as their end, agreeing one with another and with it; because all things come from one and tend to one, as *J. C. Scaliger* saies in his 6. *Exercitation. S.* 2. The Form therefore of the world is *the order or orderly disposure of Natural Bodies* Howbeit, we are here to observe, as Number is twofold, the one numbering, or wherewith we number, the other numbered, which is nothing but the things themselvs which reckoned: so there is a *twofold order*, an *order ordering*, which is an accident, and the mutual respect of the parts one to another, or as *Augustin* defines it in his *de Civit. Dei B.* 19. *Ch.* 13. a Disposure which among things like and unlike gives every one its place: and an order *ordered*, which is nothing but the things themselves aptly disposed, and such is the world. For natural Bodies, as they are aptly disposed, and participate of the condition of one first principle, and mutually accomplish and cherish one another, do make one orderly System, which is called the world.

The Form of the world.

The Efficient cause of the world.

As to the efficient Cause of the world, though the Epicureans were so mad as to think and say that this beautiful Theatre of the world was made by a blind and fortunate concourse of Atomes: yet all sound Phylosophers agree in this, that this world depends upon the *most good and great God*, as the only first principle of all principles. For as *Austin* in his *de Civit Dei B.* 11. *ch.* 4. saies, The world it self, by its most orderly mutability and mobility, and the most beautiful Feature of all visible things, does after a sort silently proclaim both that it was made, and by none but God, nor could be made by any but him, who is unutterably and invisibly great, and unspeakably and invisibly fair. And *Scaliger* in his 3. *Exercitation*, shews that *Simplicious*, *Philoponus*, *Ammonius*, *Avenroes*, and many other renowned Men, neither fewer in number nor of less Authority, then those of the contrary foolish opinion, did hold that the world depended upon God, as its Efficient Cause: and at last, thus concludes. For if by his Providence all things are governed (which no man in his wits can deny) it necessarily follows, that he was the maker of al. For if he made not the world: then he received it made by another, either as borrowed, or by force, or by sale, or as a pawn, or hired, or by lawful succession, or seazing upon it when empty, or by command, as a Minister, Servant and Mercenary from his Lord. All which are meer trifling and Impious Conceits.

The End of the world.

As for what concernes the end of the World: The *End* moves the Agent to act. But there was nothing before the world saving God alone. Nothing therefore moved God to create the world, but he himself moved himself. and therefore he created it, that he might communicate his infinite goodness. Which *Augustine* has neatly expressed in these words, *de Civit. Dei Book* 11. *Ch.* 21. *Three things we ought cheifly to enquire concerning the Creature, who made it, by what he made it, and wherefore he made it. God said* (quoth he) *let there be light, and there was light, and God saw the Light that it was good. If therefore we ask who made it? it was God. If wherefore he made it? because it is good. There is no more excellent Author then God, no more efficacious Art, then the word of God, no better Cause, then that what is good might be made by the good God.* Nor does *Plato* render any other cause, why God made the world, but because he is good. For it is the property of goodness to communicate it self. And this is the end of creating the world.

But what the *End* is of the world already constituted and existing, is elegantly taught

taught us by *Hermes Trismegistus*, in his Book *de Pietate & Philosophia*. *First there was God, then the World, then Mankind; the world for Mankind and Mankind for God.* For since every end is good, and the perfection of that thing whose end it is; and God is the ultimate and most perfect of all things: God must needs be the end of all things, and all things are for that one, which is for none but himself: and al things stand in need of God, Both to be and to be well: Man therefore was made for God, and the world for Man. But how all sorts of things are made for Man, is not so plain. For *Scaliger* cals them the Enemies of Truth, who will have all things to be made for the use of Man. For what profit hath Man from Fleas and Wiglice? 'Tis truly ridiculous to say, that Fleas are made to suck out the unprofitable blood, and Wiglice to awake us in the night, that we may fal to our prayers. Nor does *Scaliger* allow that some sorts of things were made only for varieties sake, and to stir us up to admiration: but he determines that God made all things for some certain end. For variety and bare ornament, is not the end, nor the Perfection of the Universe, but a way only to that perfection. For from sundry sorts of things orderly disposed, the perfection of the Universe does arise. *Scaliger* therefore himself thus resolves the matter: that Man is a little world, and as it were the Rule and measure of other living Creatures; yea and the Prince of al. But he could not be Prince unless he were such as he is, *viz.* In the middle: nor could he be in the middle, unless betwixt extreams. Therefore the extreams were made that he might be in the middest: and if any of the extreams, or those things seated betwixt the middle and the extreams were wanting, there would be a vacuity amongst the forms. Which is much more absurd, then that there should be a *Vacuum* without a Body. For seeing the most good God is ful of himself, and the world as the *Platonists* say, is Gods Statue or Standing Image: it must also be ful, and have no defect either in sorts, or Quantity. And therefore if even the smallest thing were wanting in the world, the Universe would be no longer the Universe, and the world would cease to be the world, that is to say, beautiful, orderly ranckt, and perfect.

God is the end of all things.

And thus far we have known the world by its Causes; it remaines that we take a view of the cheif adjuncts therof, and discuss the controversies raised touching them. Now in the first place comes Eternity; and the question is, *Whether this world be Eeternal or not?* This question is much canvased by the disputes of many Men, and the opinions of Phylosophers concerning the same have been various; some affirming the world had a beginning and shall have an end; others that it had a beginning but shal never have an end; and others again that it never had beginning nor shal ever have end. That we may therefore disintangle our selves from so great a variety of opinions, we must first observe this: that the chief question in this place is not: whether God made the world. For though the madness of some hath been so great, that they durst say that this world was made by Chance; yet al sound Phylosophers, do agree that God is the author of the world: and therefore the Author of the Book *de Mundo*, *Chap.* 6. saies Elegantly and Piously: *It is an ancient saying spred amongst all Men from their Ancestors, that all things were made both of God and by God; nor can any Natural thing be sufficiently furnished to persist in safety, if it be left to its own saveguard, without the tuition of God.* And that *Aristotle* himself knew the most good and great God to be the maker of the world, and that he expressed as much in words, is the judgment of most worthy Phylosophers. Verily if the world were not made by God, it must be made by it self: which is absurd. For a finite thing cannot be the first being; and every finite thing depends upon some other: nor are there many prime, infinite, eternal beings.

Whether the world be eternal.

The World was not made by chance.

Here therefore the question is; *Whether the world be from eternal, or were created in the beginning of Time?* The most renowned Ancient Phylosophers have held, that the world had a beginning. But *Aristotle* held that this world hath been from all eternity, as himself witnesses, in his 1. *de Cælo ch.* 10. *t.* 102. But let not us care what this or that Phylosopher hath thought, seeing our Religion does teach us, that this world was made in the beginning by the most great and good God. For whom may we better beleeve when the world was made, then God himself the Author thereof.

The World is not eternal.

But whether or no, setting aside divine revelation, it may be firmly proved by natural Reasons, that the world is not eternal, many do doubt. *Iul. Cæs. Scaliger*,

in his 61. *Exercitation* S. 6. saies that Religion only does perswade him, that the world had a beginning and shal at last be consumed by fire. Yet he concludes in his 77. *Exercitation*, S. 5. that because God is the efficient cause of the world, it must needs have had a Beginning and not be eternal. For whatsoever is made, is after its efficient cause, and nothing that is made is of equal durance with its maker, for so it should not be made. This Argument others also use, and say that for a thing to be made and to be eternal implies a contradiction. For that which was made, somtimes was not. And they say that Eternity is the duration of God alone, nor can any creature be Coeternal with its Creator.

Nor are those Arguments which *Aristotle* and his followers bring to prove the eternity of the world, such as mans wit cannot answer and refute. And I conceive it is well said, that no reason brought against our Faith is true, or can be: because truth is not contrary to truth. For though things of Faith are above the order of Nature, yet they are not contrary thereunto. For even here, these who contend for the eternity of the world, do cheifly build upon two fals foundations: one, that Creation is impossible, and that even the first cause cannot produce any thing out of nothing: the other, that God acts by the necessity of his Nature.

Creation is possible according to Phylosophy,

Now that Creation is not impossible and that the first Cause can produce somwhat out of nothing, may be evinced even by the light of Nature. For such as is the being of a thing, such is its operation: but the immortal God, since in respect of his essence he depends upon none, and needs no outward thing, neither does he need any external thing to be presupposed in his acting. Moreover God is the cause of all things, and nothing except God hath its being of it self, but all things depend on God. And in very deed, they who deny creation, and say it is impossible God should make any thing of nothing, and yet grant that God is the Efficient cause of the world (for they must needs grant that) do contradict themselves. For if God be the efficient cause of the world: doubtless, he made it of nothing. For besides God and the world, there is nothing out of which he should produce it. Others bring more reasons to prove the same. And in truth, they who deny that God could produce somthing out of nothing. they deny God to be God, that is to say, that his power and perfection is infinite.

God made the world freely.

And that God acts freely and not compelled by his Nature, and that he most freely produced this world, is not contrary to humane reason. For since God is a most perfect being, depending upon none, standing in need of none, self sufficient, *Autexousios*, *Autagathos*, and (which word was elegantly invented by *Scaliger Exercit.* 365. S. 2. *Autautos*, self, of himself: the wil of God cannot necessarily desire any Creature, nor can he necessarily produce any, nor can his power be compelled by any thing: but himself most freely wils, what by his wisdom he knows to be best: and he could, if he pleased, have made this world much sooner or later, or not at all. Yet he does alwaies, that which is best. Nor, because he made the world in the beginning, was his will therefore changed. For from eternity, it was his pleasure to produce the world, then when he produced the same. Nor must we think, as *Austin* speaks in his *De Civitate Dei B.* 11. *Ch.* 5. That any thing hapned accidentally to God, in that he made the world rather then, then in former times; since the former times had passed equally through infinite spaces, neither had there been any difference, why one time should be chosen rather then another. And as he saies, *in the said* 11. *Book*, *Ch.* 12. where he handles this argument excellently; that which we now enquire after five thousand and od years, posterity may ask with the same Curiosity six hundred thousand years hence, if this mortal condition of men born and dying shal continue so long, and they retain their childish infirmity. Those who were before us in the infancy of the world might move the same Qnestion. Yea and the first man himself, the day after, or the same day he was created, might enquire why he was made no sooner. For indeed, as he saies in the same place, all the bounded spaces of Ages, if compared to boundless Eternity, are nothing.

The world shal have an end.

As it appears from Scriptures, that the world had a beginnirg: so they alone perswade us that this World shal have an End; nor is any Phylosophical reason strong enough to prove the same. For though it be true which *Scaliger* saies in his 61. *Exercitation*, S. 5. and *Exercit.* 307. S. 20. that all things because they have not the cause

cause of their being from themselves, but depend upon another, are of themselves mutable, and corruptible; but are not corrupted, because God wil not have it so: yet true it is, that the world left to it self, with that common and ordinary concourse of God which now it has, may for ever endure, nor does it of its own accord tend to corruption: but it shall end by the free command of God, *viz.* when he shal withdraw from it his ordinary assistance, and change it into a better condition. And so much for that Question whether the world be eternal.

Whether there is but one world.

Nor is it much less controverted: *Whether this world be one.* For here Phylosophers are at great variance, as may be seen in *Mirandula* his *Exam. vanit. doct. gent. Lib.* 7. *Ch.* 20. For some have held the world to be but one, others that there are many worlds, and they either like or unlike one another. For some were of the opinion, that there were other worlds besides this, in some of which there is neither Sun nor Moon; in others, that there is Sun and Moon greater then those in this world; and in some many Suns; also that there are some Worlds void of al Plants, Animals, and Moisture: and *Metrodorus* did say, that it is as absurd that there should be but one world, as that in a vast field there should grow only one Ear of Corn.

In this variety of opinions, we beleeve there is but one world: but we hold setting aside what may be urged from our religion, that there is no Phylosophical reason strong enough to prove the same. For sure enough God can and could have made more worlds: But whether or no he will make more: none can tel but himself, seeing neither sense nor reason can inform us. For as for the reasons every where alleadged by *Aristotle* and others for the unity of the world; they are not such as do certainly prove the same. Which *Plutarch*, besides others, does shew in *his Book of the Ceasing of Oracles*, and Mirandula *in Exam. Vanit. Doct. Gent. L.* 6. *Ch.* 9. who at last thus concludes: truly, as it seems to me, if those other worlds pleaded for, be of several sorts, *Aristotles* reasons will be invalid: because the sort of Earth and water and other parts and their Nature would be different. For so the parts being of one and the same Nature would hang together and would not go out of their world; all heavy bodies would seek their own Centre, and that lighter would fly upwards, and the same may be judged of the rest, proportionably.

Howbeit this one world does sufficiently demonstrate the goodness of God, because he made it of his own accord, not being obliged so to do; also it shews his great power, because he could make it of nothing; and exceeding great it shewes his Wisdom, because he hath made al things so admirably and with such rare skill.

The World is perfect.

And although we beleeve this world to be one; yet we hold the same to be perfect, with such a kind of perfection as a Creature is capable of. For it was made by a perfect Artist according to a perfect Pattern: nor is there any thing wanting, in the absolute perfection of the things whereof it is made up, nor in their Variety. For it containes all degrees of beings. Nor in order: for in so great a diversity of things, there appears a rare order, and all things are fitly disposed in their places: all which are enclosed with the Heaven, which because it is round, the Figure or accidental form of the world, therefrom resulting, is round also. *And so much of the world in General.*

The figure of the world is spherical.

Chap. 2. *Of the Heaven, and the Stars.*

NOw the world is divided into *two* Regions, the *Etherial and Sublumary*: and being to treat of the Ethereal or Celestial in the first place, those most Famous Questions present themselves, agitated by the disputes of most Famous Phylosophers, now for many Ages: *Whether there is matter in Heaven*: and if there be, *Whether it is of the same Nature with that which is here below.* And although as to the former question, there are scruples good store on al sides: yet that opinion seemes to me more probable which attributes matter to the Heaven and I conceive it was well said of *Scaliger* in his 359. *Exercitation*, Sect. 11. *to make a Body without matter*, is all one as to make a dream without sleep: or as he hath it in his 1 *de plan-*

Whether the Heaven have matter in it.

tis Bread without meal. For where ever there is quantity, Figure and Local motion: there must needs be matter. For Quantity immediately follows the Nature of matter, and cannot be in any thing without it, and all forms and accidents have no quantity of themselves, but are said to have quantity, because of the Quantity of the matter wherein they are. Wherefore since we see, that the Heaven hath quantity, is of a certain Figure, and a determinate magnitude, and locally moved: we must needs confess that it hath matter in it.

Whether the matter of the Heavens be the same with that of inferiour Bodies.

But what kind of matter this is, whether such as this of ours, or some peculiar: is so obscure a Question, that resolve which way you will, you may easily find arguments to maintain your Assertion. We deny that the Heaven consists of one or more of these Elements of ours, which was the opinion of very many an cient Philosophers: yet I conceive we should not assign it any other matter, then this first matter of ours. For there is no need to invent a new one, nor any necessity to introduce a new being, into the Catalogue of Nature: since what ever is attributed to the Heaven in respect of its matter, may rightly be attributed to this matter of ours. *Scaliger* therefore in his *Exercitation*, 61. does well conclude this Question: One matter differs not from another, save by the Form entring thereinto, whereby it becomes this or that. For matter as matter, includes no act in it self, and has nothing determinate, but receives all determination from the Form. Whereunto this may be added, that in Heaven there is Quantity, and some other Qualities, which are common to it and these inferior Bodies, and proceed from the first matter. Which things being so the opinion of *Avenroes* cannot be admitted, who invented a new simple Body not compounded of Matter and Form, and held that Heaven was a Body, that was neither pure matter, nor pure Form, nor any thing of them compounded, but a certain middle thing betwixt these, *viz*, A certain form consisting of it self, furnished with dimensions and apt for Local motion. For these things seem to be invented without cause, yea and hard to conceive, That there should be a thing (to use *Scaligers* words *Exerc.* 61. *S.* 1.) in Nature subsisting of it self, which is neither God, nor an Act, nor a power; neither informing nor informed; neither matter nor immaterial; neither a Body nor incorporeal; without the Predicaments, and yet having Predicamental Quantity and Qualities. Which what for a thing it can be, let himself consider. And if it could be proved, that there is a simple Body not compounded of matter and Form: verily a great foundation of peripatetical Phylosophy will fall to the ground. And if there were such simplicity in the Heaven: there can be perhaps no cause assigned, why it might not also be admitted in some sublunary Bodies.

Nor if we should attribute to Heaven this first matter of ours, need we to fear that the Heaven should fal and at one time or another of its own Nature come to destruction. For according to *Zabarella* himself *Lib. de Ortu & Interitu c.* 11. who nevertheless in this point takes part with *Averroes*, the first matter, seeing it is a being meerly potential, and acts nothing, is no adequate Cause of Generation and corruption of things: and every action is to be ascribed to the Agent; and to matter, passion only belongs. Nor is matter the subject of Corruption, save when it is with Natural Forms corruptible, from which the accidents flow, which have contrarily, or contraries also under contrary differences. Therefore we must not deny the Heavens to have matter, though they be not generated nor corrupted. For there are two offices of matter. Universally and primarily it is given to all things, to sustain Quantity, and to receive motion, and the actions of Agents. For it is the first subject of Quantity, and is meerly passive, acts nothing, but only suffers: and all things naturally suffer, because they have matter. Moreover Matter is given to sublunary things, because of Generation, to which it concurs as a secondary cause, *viz*. In as much as it is apt to receive the Action of the Generator. The cause therefore why there is no Generation nor Corruption in the Heavens is, because there is nothing contrary to Heaven, by which it may be corrupted, and because it has no Particular aptitude to receive other forms, which is only opposed to act, and is really the same thing with privation. For in Heaven there is no Privation of corruptiple Forms; because the Heaven hath no immediate aptitude to receive sublunary Forms. But the Form of Heaven does so dispose and bind its matter to it self, that it has no Particular aptitude to receive other Forms, but only that same universal one, which is an aptitude to receive all Forms indifferently; in respect of which nevertheless unless a Particular aptitude be added, and a contrary agent

agent be at hand, no Generation is made. Yea and (which I would have those to consider, who think the Heaven must perish, if it have matter) the Earth which is in the Centre of the world is safe from all Corruption nor is corrupted, because no contrary Agent pierces so far, by which it might be corrupted. We conclude therefore; that *The matter of Heaven has no particular and immediate aptitude to receive corruptible forms; and that it has only an appetite of perfection, but not of Mutation*, as *Scaliger* saies. For the Matter because it cannot subsist of it self, desires to be perfected by the form, whatever form it be, whether of a Man or of a Beetle, nor of its own accord does it lay down one form and take up another; but the whol vicissitude of Generation and Corruption, depends upon the Contrariety of the forms and the qualities issuing out of them, as on its principal Cause: which seeing the Heaven has not, we need not to fear, that it shal come to decay, only because of its matter. Of which see more in *Scaligers Exercit.* 17. and 61.

Moreover that is also no Inconvenience *that there should be one matter of Celestial and Sublunary things*. For the difference and excellency of things proceeds not from the matter, but from the form; and the same first matter which bears the form of a Mushrome or Flea, is also the subject of our understanding, which is verily a divine Substance, and more noble than Heaven it self.

What is the Form of Heaven

Nor is it a less Controversie, *What that form of Heaven is*. *Averroes* and they which follow him do not allow the Heaven an informing Form, but say that it is a simple body, without composition of matter and form. But this opinion has been already rejected. But we do more rightly to attribute unto Heaven an *informing Form* also, since as we have shewed it consists of matter. For matter cannot subsist of it self, nor perform those most noble actions which proceed from Heaven, besides its motion; since it is purely passive, and no action belongs thereunto. Yea and matter of it self, cannot be moved: for *every thing which is moved is an actual Being*.

Whether the Heaven has a Soul.

But *whether it be formally a soul or not*, needs inquisition. It is indeed an old opinion of the Pythagoricks and Platonicks, that the Heaven has a soul: howbeit the contrary opinion is truer, which holds that the Heaven has no soul. For there appears no actions of any kind of living Creature therein, which can proceed from a soul; nor has it any of those Organs, which are necessary to perform the actions of a living Creature. The Heaven is not nourished: because in Heaven nothing is corrupted or dissolved, whcih needs to be restored by nourishment: nor does it feel because it has no organs of feeling, nor of other sences, nor is there any end for which the Heaven should have sences: Much less can we allow an intelligent soul to the Heaven to inform the same, lest we fal into that Error which many have condemned in *Origen*, who taught the Stars had souls and were capable of Virtues and Vices. It is sufficient therefore to attribute to the Heaven a form which is no soul; but yet more noble than the forms of the Elements, by means of which, it is that which it is, has a certain figure, and a certain power by means of its Light and Influences of acting upon these lower bodies, and also motion. And this is the matter and form of Heaven by means of which it is also rightly termed a natural Body. For if it were destitute of these, a just cause could hardly be found, why it should be called a natural Body. And this Body consisting of matter and form is termed Æthereal.

Some parts of the Heaven perspicuous, some not, Whether the Heaven is one continued Body?

Moreover the Parts of the Heaven are *twofold*, some *quite perspicuous*, which are the Orbs, and are sometimes in a special manner cal'd Heaven, others *are not to be penetrated by our sight, and shining*, called Stars. Touching the Orbs certain weighty questions are moved, and in the first place we are to enquire: *Whether the Heavens be one continued body, or distinguished into divers Orbs or contiguous Spheres*. Now the ancients have endeavored to prove that there are many Heavens, by reason of the diversity of motions, which cannot be in a simple body: seeing every simple body, is moved with one simple motion naturally, as *Aristotle* tels us 1. *de Celo ch.* 2. *t.* 7. For when the ancient Astronomers and natural Philosophers, began to observe the motions of the Sun and Moon and other Stars; they observed that all the Stars did not observe the same swiftness and distance, in their motion, but that some were moved more swiftly, others more slowly, some never joyned but alwaies keeping the same distance one from another, and others again coming neerer one to another, even to a conjunction; that the Sun went alwaies in the middle of the Heaven,

Heaven, and that the other Planets declined some whiles to the North other whiles to the South. From which variety of motions they gathered; that the Heaven is not one continued Body, but is compounded of divers contiguous Orbs.

But most of the latter Writers deny, that the various motions of the Stars do rightly prove a plurality of heavenly Orbs; and they aver that this variety of motions does not proceed from the number of the Orbs, but that it belongs primarily to the Stars themselves. And in very deed it is more likely, *that the Stars are moved of themselves with their own proper motions*: and that the Heaven is a body, not hard, nor distinguished into real Orbs, wherein they stick fast and are moved by their motion, *but a body fluid like the Air, of a substance most thin and delicate wherein the Stars perform their motions.* For not to speak now of refractions, of which if the Heaven were solid, there should be two. one by reason of the vapors ascending from the Earth, another by reason of the solid body of the Heaven: whereas nevertheless those skil'd in Opticks and Astonomy, have observed one only refraction which is sensible and worthy of note: the motions of the Comets, do evidently demonstrate that the Heaven is not solid. For since it is now out of Controversie (unless any wil call in question the most certain demonstrations of Astronomers) that Comets or unusual Stars (for we shal not now contend about the name) have been seen in the Region of Heaven above the Moon, and have observed peculiar motions, not like the motion of any other Star fixed or planetary; this could not be, without the penetration of Bodies if the Heaven did consist of solid Orbs: For if the body of the Comet were fixed in the orb of any fixed or planetary Star, it would alwaies keep the same distance, from the said Star or Planet. Which since it does not, a peculiar Orb should be attributed to every Comet, to carry the same about: Which cannot be; since the whol Cystern of Heaven according to the ancient Doctrine, is possessed by the Orbs of the fix'd Stars and Planets. Also the motion of of the Planets proves the same. For seeing they are somtimes neerer the Earth, somtimes further off, which the Doctrine of *Paralaxes* teaches, and the appearing Quantity shews; for *Venus* appears somtimes so great that the unwary beholders take her for a new Star; and *Mars* is somtimes seen equal to to *Jupiter* in bigness: which cannot any otherwise come to pass, save because in the fluid and penetrable body of the Heaven, the said Stars come somtimes neerer the Earth, and otherwhiles go farther from the same. And how could *Mars* be somtimes higher, otherwhiles lower than the Sun, if both were carried in a solid Orb?

The Stars are moved by a faculty planted in them by God.

The Premises therefore considered, we must hold that in that same fluid, penetrable, most thin delicate, and invisible body of Heaven, *The Stars are moved by a power and faculty implanted in them by God their Creator*, without any violent and external impulse or carriage. For that God who willed and commanded, that the Stars by their Motion, should describe the Times, Daies, and Years, gave them power likewise to Effect the same. And if the Creator could put such Power into the Elements Earth and Fire, that in a most streight Line, the one should move down to the Centre, the other upwards from the Centre, why could he not give the Stars such a power as to move circularly? And therefore *Cicero* vainly wonders in his 2. *de Natura Deorum*, where this constancy comes in the Stars, this so great an agreement from all Eternity in such several motions, how it can be without Mind, Reason and Counsel. For this faculy of Motion is not quite void of reason and Counsel, but by the most wise Creator, it is granted to these his Forms and Instruments.

Why Astronomers retain the Orbs.

Mean while it hinders not, though the Circles and Orbs be retained by Astronomers as hypotheses. For such figures are not without cause used, to describe the motions of the Stars, as are described in the said Orbs, and Circles.

Heaven is a most simple Body.

Now this Heaven is a *Body most simple and most pure*, of a different nature from the Elements and therefore a *fift Essence* so called by *Aristotle*: which also is true nevertheless of the Stars. *It is void of all color cleer and transparent*, and therefore

The Heaven is not colored.

cannot be seen. For though as *Scaliger* saies in his 66. *Exercit. Sect.* 1. the Heaven seems to be of a blewish or saphire color: yet it rather seems so, than is so indeed. For even the Air also, though neer us it have no color, yet afar off it seems to be color'd. The Reason is, because it is thickened, not by composition of parts, but by disposition. For distance represents many parts to the sight, disposed al along in a visual line.

The

The said *Heaven is unchangeable and uncorruptible* (as also the parts) For there is not any body in the world, by which the Heaven or the Stars, can be affected or changed. Contrariwise, the Heaven has power to work upon these lower bodies, and does diversly affect them. For though the chief action upon these lower bodies, proceeds from above from the Stars: yet must not all active power be denied the Heaven it self, wherein the Stars are and are moved; seeing it also has its form, which can no waies be idle. Moreover the Heaven is the *greatest of all bodies*, since it imbraces all other bodies of the world in its Compass: also it has a *Spherical Figure*, because it is of all others the most capacious.

It is unchangeable.

The Heaven also it self works upon these lower bodies.

It is the greatest of bodies.

As to the Nature of the Stars, it is indeed commonly held, that they are the thicker parts of their Orbs; but the truer opinion is, that the most good and great God, did on the fourth day distribute that same primitive light, which he made the first day, into the Stars, and hence was the original of all this number of Stars. For it is absurd to think that first light returned to nothing, seeing it was good. Or if any man please to place that primitive light in the upmost region of the world, above the starry Heaven, and to make that upmost Region its mansion place; yet it must be confessed, that God the Author of the world, created the Stars themselves ful of light upon the fourth day; whereas he created the Heaven before, upon the second day. And this light is, doubtless, a most noble substance, most excellent, most simple, than which among all bodies, nothing is more beautiful, more sweet, nothing more admirable: by which all these sublunary things are enclined and cherished: without which this world would have no beauty: this as among bodies it is most beautiful, so it is the first and chiefest Image of the wisdom, beauty, power and goodness of the most high.

The Original of the Stars.

Howbeit, the inmost nature and Essence of this Light, is unapproachable and unsearchable by humane wit; and therefore we cannot in this darkness of humane understanding perfectly understand the nature of the Stars. For seeing the Essences even of those things which are about us in this lower world, are unknown to us; 'tis easie to see how little we can promise our selves concerning the knowledg of things so exceedingly remote.

Very like it is, That *every Star has its proper substantial form*, and as here below, Plants and Animals do by their forms differ from the Air wherein they live, and one from a nother, so also that the Stars differ both from the Heaven and one from another, by their specifick forms, which appears even from their essential proprieties and Effects. For the Stars have light, the Heaven has not; and the Stars do therby differ one from another; and Experience shews, that these things below are differently affected by different parts.

Since therfore we cannot pierce into the knowledg of the inner form and Essence of the Stars, let us weigh and consider these proprieties and effects which flow from the form and Essence of the Stars. And there comes here chiefly to be considered, Their Motion, Light and Shine, Heat and hidden Influences.

And in the first place the most wise and powerful Creator, has placed this power in the Stars, that every one is moved with a certain motion; and he that commanded them to describe the times by their motion, gave them a power to move and to perform what he had commanded.

The Motion of the Stars.

Now these Stars have a double motion. For some are moved with an equal motion in such sort, as they retain alwaies the same distance one from another, and these are commonly cal'd the fix'd Stars: others have divers motions, nor are they alwaies equally distant one from another, but now are joyned, and after a while separated, one while they are neerer another while further one from another; and those Stars are called Planets.

Some Stars are fix'd others Planets.

Which being so, they make two motions of the Stars, one whereby the fixed Stars are perpetually moved altogether, retaining the same distance one from another: the other is both differment for the motion of the fixt Stars, and thereby every Planet is moved after a peculiar manner. These motions are vulgarly termed the first and second motion, and they teach that the first motion, is that whereby the uppermost Sphere is carried about once in twenty four hours, and carries all the other Spheres with it from East to West; and the second they say is that which is proper to the rest of the Spheres, whereby they move contrary to the *Primum mobile* or first Sphere from West to East, some more swiftly, others more slowly: which

whether there are two motions of the Stars?

which distinction of motion we willingly allow the Astronomers, if they wil take it as an Hypothesis or supposition. Howbeit we conceive this distinction needlesly introduced into the Schools of Natural Phylosophy, and peradventure against the the Consent of Nature: and we think it no absurdity to say that all the Stars are moved from East to West, the fixed ones most swiftly, in the space of twenty four hours the rest by how much they are lower, so much the slower, and the Moon most slowly, much about the space of twenty five hours, only some minuts less.

For that seems not a sufficient Cause which they assign for their second motion, *viz.* Because we see the Moon or some other planet, which was joyned to some fixed Star, in the West or the South, after one or two daies, one or more degrees Eastward, that Star being left Westward, with which it was before conjoyned, it becomes nearer and therefore was moved from the West toward the East. For if you shall suppose all the Stars to move from East to West, and every upper Star to be swifter then the lower, there wil be the same appearance in the Heaven, and the lower which move more slowly will be left behind by the upper which are moved swiftly: which is more likely to be true then that the planets move towards the East. Let the Sun and Moon be joyned in one point Westward and let us suppose that the Sun once in twenty four hours and four minuts, and the Moon in twenty four hours, are carryed about the Heavens; when the day following, the Sun shal be returned to the same point, the Moon wil be yet distant therefrom almost twelve degrees, and will at last reach it after fifty one minuts are past. And this opinion which we propose *Plato* seems to have favoured in his 7. *de Legibus*, where thus he writes concering the Sun, Moon, and other Stars. *Every one of them goes round the same way, not many waies but one way: though they seem to be carried about by various and manifold waies. And that amongst them which is most swift, is not rightly judged to be most slow, and that which is most slow, most swift.*

Howbeit as to the period of the Stars, and their return (as they cal it) to the same point of Heaven; it comes all to one pass, whether you hold the Stars to be moved with one motion or with two. For the Moon being departed from one point of Heaven, after twenty nine daies or near upon, she is seen in the same again, which space is called *Mensis Lunaris*, the Moones month. The *Sun*, *Venus*, and *Mercury*, return to the same place in the space of about a year: *Mars* in two years; *Jupiter* within twelve years; *Saturn* in the space of thirty years; the fixed Stars in the space of 48000 years, which space of time they call *Plato* his great year: and *Plato* is said to have beleeved that when so many yeats are past, al things in the world shal return unto their old State.

Lux, Lumen, and *Radius, how they differ.*

In the next place we are to consider in the Stars their *Lux* and *Lumen*, Light and Shine, then which the whol world hath nothing more pleasant, and which are rightly called by *Franciscus Patricius* in the *fourth Book of his Panaugia*, the good and great God his greatest and best Instrument. And first let us see what *Lux*, *Lumen*, and *Radius* are, and how they differ one from another. Some there have been and still are in that opinion, that Light is a substance and the Form of the Celestial Bodies; but their opinion swerves from the truth; since no substantial Form can be discerned by the sight. We must therefore hold, that *Lux* light is a quality and Essential propriety of a lightful body, of it self perceptible by the sight. But what is the first subject of light, or, whether all the Stars shine with their own light, or borrow it from the Sun, herein the opinions of Phylosophers do vary. For some hold all the Stars shine with their own proper light, others hold they al borrow their light from the Sun, and others again hold that only the Moon borrows her light of him. This is our opinion: That all the Stars do indeed receive some light from the Sun: yet that they have also some light of their own. Both which we are taught by experience. For first we may chiefly observe, it in the Moon, which in regard of her several posture to the Sunward, hath various Appearances, in regard of the Variety of light which she receives from the Sun: the same is to be seen in the rest of the Planets, which are observed to be brighter or darker in regard of their several postures to the Sun. And therefore *Orpheus* calls the Sun the quickening Eye of Heaven: *Heraclitus*, the Fountain of Heavenly light; the ancient Phylosophers, the Heart of Heaven; and the *Platonists* placed the Soul of the world in the Sun, as *Marsilius Ficinus* tels us in *his Book de Sole Ch.* 6. The latter may be observed not only in the Moon, but also in the other planets. For in the

The Stars shine both with their own and borrwed light.

Ecclipse

Ecclipse of the Moon, we see she has some light, and the same appears also after her conjunction. when we may many times see that part of her which is from the Sun, by means of her inbred light: which also any one may observe in the planets which are lower then the Sun, as *Franciscus Patritius* teaches, in the 7. *Book of his Panaugia.*

From the light proceed *Lumen* and *Rady*, shine and Beams, which *Franc. Patritius* saies are two divers things in the 3. *B. of his Panaugia.* The truth is, where there are Beams there is shine, but there may be shine where there are no beams or raies. For in a Chamber which looks towards the North, and is not right against the Sun, there is a shine at noon tide, but no beam or Raies. And therefore a Ray or Beam as he there shews, is as it were a secondary Light, or a brightness arising from the first light, and shooting to a right and an acute Angle. And *Lumen* or shine, is as it were a third light, flowing from the first and second, not diffused into Lines and Pyramids, but loosely shed abroad. First therefore there is *Lux* light in the lucid Body; then there is *Radius* a Beam which is an image of the light, diffused from the lucid body in a right Line; thirdly *Lumen* or shine, which diffuse it self obliquely, aside the falling of the raies into all parts of the *Medium.* And indeed there seems to be some difference between a Ray and shine, or at least it is one thing to represent the light as a visible object and to offer it to the sight, and another thing to Illuminate the Air. For light seen from a dark place, does not enlighten all the air, betwixt the eye and the lucid thing; and that light which enlightens the Air hardly a furlong, is seen some miles of, in the night time; yea and the Stars themselves, are seen by us at an huge distance in the night; though they do not illuminate the whol Air. Which difference causes, that there is a twofold definition of *Lumen* or shine. For absolutely considered, shine is the image of light, or the quality of a Lucid Body, whereby it communicates it self to other Natural things, affording it self to their sight, and cherishing them. But as *Shine* is considered in respect of other things which it inlightens, it is the act of Colours whereby they become visible.

What a Beam or Ray is.

Now concerning *Lumen* or shine some Controversies are agitated. And first touching the Nature thereof there hath alwaies been great dissensions amongst Physophers, which are not yet composed, so that it is dangerous to determine any thing in this point. Howbeit I shall breifly deliver, what seems probable in so obscure a matter. Now the question is whether it be a substance or an accident. For there are very many who hold that it is a substance, some corporeal, others incorporeal. And they that say the Raies and shine are a substance, are cheifly moved thereunto, because the shine and Beams are diffused through the Heaven and the Air, and that in a moment; which seems improper for an accident, which passes not out of one subject into another and because falling upon a dark and solid body they are reflected and leap back again. And those arguments could almost move me unless the same arguments, did make as much against all visible, yea, and sensible species or representations. For, neither are other visible species moved with the motion of the Air, and they are in a moment diffused through their whol Sphere: Yea, and some also, witness the Eccho, is reflected And therefore as oft as I think of this matter, I thus complain of the obscurity of Nature with that most learned Physopher and Physitian *Hieronymus Fracastorius.*

Whether light is a Substance or Accident?

What shall I say, Poor wretch, that I do, what life that I lead now?
Restless in my mind, and alwaies busily searching
After Nature, who still flies, and leaves me behind Her.
And when a while sh'has shewd her self, then straight in a moment
Proteus like to a thousand shapes, She turns Her Visage.
And so She leaves and vexes me, continually mourning,
For lost Labour, and old Age, so vainly bestowed.
For when of late I busily Sought, those thinly appearing
Images that flow from things and shed them all over,
And to the Wayles woods went alone to the Silent
Secret shades, there I found, how by these shews I deluded
Was, though they smite alwaies our sense and still they assail us.
Passing and Repassing through the Doors of our senses,
Haunting our Soul all day, and in the night when She sleepeth:

These are Hexameter Verses in Imitation of the Latine.

Lumen, light, or shine is an accident not a substance either corporeal or incorporeal.

Yet if we may say what is probable, that opinion seems to be trueſt, which does affirm that light is neither a Body nor a ſubſtance incorporeal, but an accident, and quality produced by a lucid Body in a tranſparent Medium whoſe act it is. For if the light were a body, ſince it is diffuſed through the whol Air, and is received by all the parts of the Air, there would be a penetration of Bodies. Moreover, if it were a Body, it ſhould be moved ſucceſſivly in time. For a Body cannot be moved in an inſtant through a Medium filled with another Body: becauſe the middle Body through which it is moved, would reſiſt the ſame in its motion. But we ſee the light ſpred far and near in a moment. And that it is no incorporeal and ſpiritual ſubſtance is hereby apparent: in that ſpiritual ſubſtances fall not under our ſenſes, or have dimenſions; both which are true of Raies and Light.

Whether light be a real or intentional accident.

That light therefore is no ſubſtance but *a Quality*, hath been made appear. But whether it be a *real* or *Intentional* accident as they Phraſe it, is a great queſtion amongſt the expoſitors of *Ariſtotle*. And in the firſt place we muſt rightly underſtand the ſenſe of this queſtion. An intention and an intentional being, though it is commonly taken only for that which depends upon the operation of our mind, and without it, is nothing, *viz.* For an intelligible ſpecies which repreſents ſomwhat without the Soul to our underſtanding, either immediately, ſuch as are the firſt notions, or mediately by the mediation of the firſt, ſuch as are the ſecond notions: yet here in a more general ſenſe, the word Intention, ſignifies that which is the Image and repreſentation of another thing without the Mind, that is to ſay the repreſentation of a ſenſible ſubject in the Medium; and ſo an intentional being is taken for every ſpiritual ſpecies repreſenting a real object, whether it be ſenſible or intellectual. So the Collor which is in our Cloaths or on a tree, is called real; that which is in a Looking-Glaſs, and is the Image of the color in the Cloaths, and that which from the tree is ſhed upon the Cloaths of him that lies under it, is ſaid to be an intentional color. And in this ſenſe we hold, that the ſhine, is an intentional quality: yet that nevertheleſs, it is a real being, as having its own Eſſence, without the operation of our mind, yea, and that it hath a more noble office then other intentional ſpecies ſo called, and that it is ordained out only for repreſentation, but alſo for other effectual operations. Others do thus explain the matter. That light is a ſpiritual quality, not principal or real, or rather material. Now there is a great difference betwixt principal or material, and ſpiritual Qualities. For the former are not the image of another thing; they are received in the ſubject ſucceſſively, and are moved in time according to the motion thereof; they are not totally in any part of the ſubject; they are not many of the ſame ſort in the ſame ſubject, differing only in number, and kept unconfuſed and diſtinct. Whereas the contrary holes in ſpiritual Qualities; as we may ſee in *Lumen* or ſhine. For ſhine is the Image of Light; 'tis ſhed through the whol Air in a moment; it is not moved according to the motion of the ſubject. For though the Air is toſſed with winds yet the ſhine of light is not moved thereby. Every part of the ſhine repreſents the whol lucid Body from whence it comes. and in the ſame part of the Air, many images of lucid Bodies or lights are kept diſtinct and inconfuſed.

The diviſion of a Ray or Beam.

A Ray or beam is divided into a right, a reflex, a fract, and a refract: and that is termed right or ſtreight, which paſſes from the lucid Body, without any hindrance of a dark Body. That is reflex, which lighting upon a thick dark Body rebounds back. That is fract, which paſſes out of a thin into a groſs Medium, as that which comes out of the Air into the Water. That is refract, which comes out of a thick Medium into a thin. Howbeit *Scaliger* oppoſes the terms of a reflex and fract *Radius* in his *Exercit.* 75. *Sect.* 10. and conceives, not without cauſe, that that which is commonly called reflex, ſhould rather be termed fract: for the reflex commonly ſo called, is not one Beam but two; one falling on, and another rebounding back: and that the fract, ought rather to be termed ſhed. or powred abroad. For that is one Ray, which is in the Water and in the Air; differing only in the variety, and denſity of parts, being thinner in the Air.

The Heaven & the Stars do not therefore heat, becauſe they are fiery.

After *Lux* and *Lumen*, Light and Shine, the Heavenly heat comes to be conſidered, and the cauſes thereof to be ſearched into. And although, not only ſome of the ancients, but of the latter writers alſo, have been of opinion, that the Heavens and Stars do therefore heat, becauſe they are of a fiery Nature, and have in th m

Heat

Heat formally, as a Natural accident, by means whereof they again heat other things: yet that opinion is by most men rejected, and it is resolved, that the Heaven though it is not of its own Nature hot, hath yet a power of heating these inferior Bodies; and as *Scaliger* conceives in his 23. *Exercitat.* that the heat is indeed from the Stars, but not in them, but in these bodies beneath; and in the 74 *Exercit. Sect.* 2. that calefaction or heating does primarily and of it self belong to the Sun, without any Medium, as to a first Body, the author of Heat, but not the first subject thereof. But if any man shall hold, that the Stars are hot, not with a fiery heat, but with an heat proper to themselves, I see not by what solid reason, he can be confuted. For there is no cause why the Heaven should be void of all qualities. And Heat seems to be an individual companion to light. Nor need any man fear, that the Heaven should be corrupted by these inferior Bodies, if it be hot. For since the Heaven does not participate with these inferior bodies, either in the Nature of its Essence, or its Qualities: the inferior bodies no waies act upon the Celestial. Nor was *Carden* the first that held heat to be in the Heaven, but the *Arabian* Phylosophers long before, and *Mirandulanus* and others who followed them. For thus writes *Joh. Picus Mirandulanus* in *Astrolog. Lib.* 3. *Ch.* 4. Heat follows light as a propriety thereof, not fiery heat, nor Aereal but Celestial; a proper quality of the Heaven, as light is. I say an heat most effectual and saving, peircing al things, cherishing all things, moderating all things.

How Heaven heats these lower Bodies.

From the Premises some light arises to that Question, how Heaven heats these lower Bodies? 'Tis commonly held that Heaven heats them, by its motion and light. But touching motion, 'tis a doubtful case. It cannot indeed be denied, that a swift motion of a solid Body, does heat the Air next unto it: since experience shews that to be true. For motion does heat by attenuating, it makes the parts of the Air thin, and so heats them; yea and if it be more vehement, turns them into fire. For the fire being, as hotter, so thinner, then the Air. If the Air be a little more attenuated, the Form of the Air can no longer subsist in a thin matter, but the form of Fire is introduced. But this is doubted, whether the Heavens motion, produce heat in these lower Bodies? some holds the motion of the Heaven pierces as far as the Earth, yea and into the inmost bowels thereof, and produces heat by making the Air thin, and by grating thereupon. But contrariwise, *Scaliger* in his 23. *Exercit.* saies, that he did not beleeve the Son of *Roes*, who said, that the Heavenly Bodies did not warm by any heat in themselves, but that through the swiftness of motion, both heat and light came from the Stars, by their motion grating upon the Air; and held that the cause of the motion of Heaven was, that the Stars might communicate their virtues to the parts here below, but not that they should heat. And indeed great cause there is to doubt, whether the Heavens motion do heat the inferior Bodies. For they who hold that the Heaven by its motion, warms these inferior Bodies, do all presuppose, that the Heaven is a solid Body, by the Circumvolution whereof, the neighbouring Elements are wheeled about. But that this is false, hath been already declared. Nor can the bodies of the Stars perform that with their motion, nor does their motion reach to these lower bodies, by reason of their so great distance. Nor does that fire which is next the Moon, receive heat from their motion. For it hath the highest degree of heat before, by its own Form. For if it were not in the highest degree hot, it were not fire. And therefore the fire hath not its essential heat from the Heavens, but an accidental heat, as the most subtile *Scaliger*, in his 23. *Exercitation*, saies subtilly, Yea, and obscurely enough. For what heat can be added to that which is hot in the highest degree? But peradventure, that is thus to be understood. That the fire receives not essential heat from the motion of the Heavens, but hath it from its own form; but it is nevertheless preserved by Heavens motion.

Whether the motion of Heaven be a cause of Heat?

The fire has not its essential heat from Heaven.

Now it is commonly held a clear case, that the shine is the Cause of heat: though that of *Scaliger* in his 75. *Exercitation*, may give occasion of doubting. *Heat* (saies he) *is an accident bred by the Heavenly Bodies, and through the Heaven, without any affection thereof, brought to the Aire, and that not by the shine, but both with and without the shine.* And indeed the Raies or Beams, rather then the shine, are the cause of Heat.

The shine is not the Cause of heat, but the beams.

For there is not Heat, where ever there is shine, and in Winter, the Cause of the cold is not want of light; seeing in the middest of Winter, there are many times

as clear and bright daies as in Summer, but it is the obliques of the Suns beams. And therefore when *Lumen* or shine, is said to be the cause of heat; the Beams or raies are to be understood.

How the Raies or Beams do heat?

But how the Raies or Light does heat, Doctors are not yet agreed. Some are of the opinion that light therefore heats, because it rarifies and makes thin the Air, after the same manner as motion does; and that the doubled Raies do it in a special manner. For though the incident and single Raies, have also the power of heating and attenuating: yet their force, they say, is weak; but the doubled Raies beating one against another do more strongly grate upon the Air and rarifie the same. Howbeit many do contrarywise hold with probability enough, that the light does of its own Nature produce heat, and that a Ray compounded of a streight one and a reflex, does heat more then a simple, not because two Raies smiting one against another do grate upon the Air (for how should that great upon the Air which is no Body?) but because, that portion of light which was to go streight forward, being hindred by an Opake Body is reflected, and joyned with the incident Ray, and so virture conjoyned becomes stronger then that which is dispersed. Hence some Raies are stronger then other some to excite Heat. For those which fal perpendicularly, and reflect upon themselves, are of al others most effectual: and those are next these most powerful, who go least into oblick Angles; but the more they go oblickly from the point of incidence, the least heat they raise. For the nearer the Sun comes to our Zenith and the directer his beams fal upon us; so much the greater heat is caused. And it goes contrariwise in the Winter, when the Sun darts his Beams upon us oblickly.

Perpendicular raies most effectual.

The Stars are not placed in Heaven only for ornament sake.

Now it will be worth our while to enquire whether the Heavens do not also some other waies work upon these inferior Bodies. There are some Men found so silly as to dare to deny, not only other more noble actions of the Heavens upon things below, but also their power of heating; and to hold that the Stars were set set in the Heaven only for ornaments sake like Golden Spangles; of which sect of men *Nicho. Frischlinus* seems to have been. But away with such Barbarousness! *Asclepius* was long since of a better understanding, when he thus wrote to King *Ammon*: the good operations of the Sun, are not terminated in the Heaven and Air alone, but even in the Earth, they pierce into the deep bowels thereof: from whose Judgment, the learned Men of latter ages, have not receded, but all have taught, that Heaven acts upon these lower Bodies, and is a cause of much good to mortal Men. For nothing in the whol Universe is idle, nothing made in vain, but all things as they have their Forms; so by them they operate and act. Experience not to be contradicted does witness the same. For we see and feel, how that by the Heavenly Bodies, through the various augmentation of heat, the changes of times and seasons, and the vicissitude of generation and corruption are caused; tempests are raised; the humors of Animals, especially shelfish do encrease and lessen according as the Moon Fils or Wains. Let them go therefore, who deny the Heavens to have any virtue, and let us consider: whether *besides their light the Heavenly Bodies do work upon things below, also by another peculiar and hidden way, which they call influence?* Most indeed of those who write against Astrology, say that the light only of the Heavenly Bodies, which is variously communicated to several places according to the variety of the Heavenly motions, is of it self sufficient to produce all the effects, which are produced by the said Bodies. Yet we must hold the contrary, *viz.* That the Heaven, not only by its motion and light and the heat thereon depending, but also by certain peculiar powers, which they call influences, does act upon these lower Bodies. For many effects proceed from Heaven, which cannot be ascribed to light. For light may be kept out, by a dark or dense Body; whereas many things are generated by the concurrency of Heaven in the profoundest Cavities of the Earth, under the Waters, whether neither the light of Heaven nor the heat produced thereby can pierce. And verily since there are in the Load-stone and other vulgar things, rare virtues to act upon distant things, without any light: we ought not to deny the same to the Heaven, so Magnificent a Body.

Whether the Heaven works by influence upon the inferior bodies.

The Heaven works upon things material, but does not immediately act the same.

Howbeit we must enquire how far this Influx of the Heavens extends it self, and upon what things it works. It is not to be denyed, that *the Heaven acts upon all material and merely Natural things*: but it is a question, *whether that Celestial Influx,*

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do work upon our Soul and will. All found Phylosophers do answer *that the Stars do not work directly and immediately upon our wils.* For since the Heaven is a corporeal and material Agent, it acts only upon corporeal and material things, but our will is a power not allied to matter. Mediately nevertheless and indirectly, *viz.* by Mediation of the Organs of our Body, which being variously Qualified do move and provoke the Fancy and the sensible appetite, and thereby the will; the stars may encline our wil to this or that. Upon which ground 'tis also commonly said, that Mens manners follow the temperament of their Bodies. Howbeit, neither the temperament, nor the stars by the temperament do compel but only encline. For though any one through aboundance of Choler in his Body, be enclined to anger, and through flegm to idleness: yet it remaines in the liberty of his will, either to refrain or give the reines to his anger; or to give himself to labor or to take his ease. Hence we may easily know what to think of Astrology, which is said to foretel future events, by observation of the Heavenly Bodies. It is not to be denied, that Astrologers may many times probably foretel Tempests, Rains, Barrenness and fruitfulness of the Earth, Diseases, and other such like Natural effects, which Naturally depend upon the disposition of the sublunary matter in respect of heat cold, Moisture, Driness, and other such like qualities, and may betide sublunary Bodies. Yet Experience shews that they cannot alwaies certainly foretel such things as these.

What is to be thought of Astrological Predictions?

For seeing there is requisite to these kind of effects, not only the influx of the Heavenly Bodies, which is the universal Cause, but also a certain disposition of the Earthly Globe, which affords matter to Rain and other Meteors, and also of the Matter and sublunary qualities, which are all unstable and subject to change, and cannot be sufficiently discerned by the wit of man: the judgment and prognostication cannot alwaies be firm and certain. Much less can any thing be certainly foretold concerning human actions which depend upon the wills of Men, and touching things contingent and fortuitous. For though these things depend in some measure, as hath been said, upon the temperament: yet because our temperament does not compel our wil, and the Heaven it self is not the immediate and principal Cause of the temperament, it is also hard in this Case to foretel any thing with certainty.

Nor dare the founder Astrologers themselves attribute any greater efficacy to the Stars, nor to themselves any greater ability of Prediction. Whence also *Ptolomy* himself, *de Pred. Astronom. Lib. 7.* teaches that those things only can be foretold, in the Calculation of Nativities, which depend upon the temperature, *viz.* That the Body of such an one is so and so, and his manners so and so, whence such and such events will follow, because the quality of the Heaven suitable to the temperament, is fit to produce a good habit, or contrary thereunto. And he himself saies in terms expres, that those who foretel other things, which have not Natural Causes, are cousening fellows, that abuse the people. *Ptolomy* therefore the Prince of Astrologinians hath set them their true bounds and limits: within which nevertheless, all the Predictions which he delivers in the following Books, can hardly be contained. And the same Author also teaches in *Lib. 1.* That many things besides the Heaven, do concur to the Temperaments of Particular persons, and that the seed falling from the Bodies of their parents, hath the chiefest force, also that the Countrey makes a difference, and that education and Custom have no smal force to change the temperament.

The Causes of many Sympathies and Antipathies doubtless, betwixt the Heavenly Bodies and these things below, do proceed from these hidden influences, the Inquisition whereof does belong unto another place. Mean while let us hold with that opinion of the Chaldæans and Assyrians, recorded by *Psellus*, viz. *That there is a Sympathy betwixt things above and things below.*

As to the other adjuncts of the Stars, *viz.* Their Figure and quantity: that their Figure is Spherical is Demonstrated. First, By the Illuminations of the Moon: Secondly, By the Ecclipses; the sight of all Men wherever inhabiting: since plain Bodies do change their Figure as often as those who look upon them from below, do change their place and Situation.

The Figure of the stars is Spherical.

And whereas the Stars appear flat like dishes; that comes from their over great distance, for all lines drawn from the Eye to the surface of a Sphærical Body fat off

off, appear equal to the middle or perpendicular line, drawn from the Centre of the Eye, to the Centre of the spherical body. *Vitello B. 4. ch 65.*

Two sorts of Stars fixed, and wandring or Planetary.

The Stars are of two sorts, the Planets and fixed Stars, as was said before. Those are called fix'd Stars, which are in the uppermost part of Heaven, and in their motions do alwaies keep an equal distance one from another. The Planets or wandring Stars, are not so called, because they really wander, or are moved with an uncertain motion, but because though they hold a certian rule in their motions, yet in respect of the fixed stars, they have a more free kind of motion, and are somtimes in one, another while in another part of the Heavens.

The number of the Planets.

The Planets are commonly reckoned to be but seven. For though *Favorinus* in in *Gellius B. 14. ch. 1.* did doubt whether there were only seven Planets; and supposed there might be more, though not seen by us, in regard of their exceeding either splendor or altitude: yet because neither experience, nor reason can evince there are more, the vulgar number has been retained hitherto.

Howbeit amongst the late Astronomers *Galilæus* a Florentine, has found out certain new Planets, formerly not known or seen by any man, by help of his optical Tube or prospective Glass; which he observed to move about *Jupiter*, and cal'd them the medicean Stars (from *Cosmos medices* the Duke of *Tuscany*, so called, to whom he dedicated his labors) also the Jovial Stars or *Jupiter's* Stars: whose number and motion he described in a Book called *Siderius Nuncius*: wherein he described other things by him observed in the face of the Moon, in innumerable fixed Stars, the Galaxy or Milky way, and cloudy Stars, worthy of consideration.

The number of the fixed Stars

Astronomers at this day reckon the fixed Stars to be 1022. but there are more indeed and in truth. For even *Pliny* in his *Natural History B. 2. ch. 41.* saies that skilful men had reckoned 1600. remarkable for their effects and use; and those that have in our times sailed into the South parts of the world, relate that they have observed more. And therefore though we may grant to the Astronomers, that there are so many fix'd Stars which may evidently be observed, and may conducce to a astronomical Calculations: yet if any shal contend that there are indeed no more, we shal stop his mouth with that of *Austin* in his 16. *B. de Civitate Dei ch.* 23. *Whosoever* (saies he) *boast that they have counted and set down the total number of the Stars, the Authority of this Book* (Gen. 15.) *does condemn them:* and that there are indeed more, the observation of the foresaid *Galiæus*, does evince.

The Order of the Planets.

Also there is some controversie touching the order of the Planets: *Metrodorus Chius*, *Anaximander* and *Crates*, as *Plutarch* informs us in his *2. de Placit. Phylos. ch.* 15. held the *Sun* to be highest, next him the *Moon*, after her the fix'd Stars and Planets. *Plato* and all the Greek Phylosophers in a manner, did beleeve the Sun to be next the Moon. *Ptolomy* placed the Sun in the middest of the Planets, and made such an order of the Planets, as that the Moon should be lowest and next the Elements, *Mercury* next above her, *Venus* next above him, in the fourth place the Sun, in the fift *Mars*, in the sixt *Jupiter*, in the seventh *Saturn*, in the eighth the fixed Stars, which opinion is by most men followed. For both the observation of the Parallaxes, and other Astronomical reasons do confirm the same.

For the greater Parallaxe a Planet has, the neerer it is to the Earth; and the lesser parallaxe, the further from the Earth. But amongst all the Planets, the Moon has the greatest Parallaxe; *Mercury* somwhat a lesser; *Venus* yet a lesser; and the Sun the least. Whence we collect, that the Moon is neerest the Earth, *Mercury* a little further off than she, *Venus* more remote than he, and the Sun more remote than *Venus*. Moreover the Moon obscures and takes out of our sight *Mercury*, *Venus* and the *Sun*; which could not be, if these Planets were lower.

Nevertheless, although this be certain, and the reasons aforesaid do sufficiently demonstrate, that the *Moon* is below *Mercury* and *Venus*: yet it is not thereby proved that *Venus* is higher than *Mercury*. For suppose the *Moon* obscure *Venus* and *Mercury*: yet it does not hence appear, whether *Mercury* or *Venus* be next the *Moon*, or whether *Mercury* be below or above *Venus*. Nor do the Parallaxes demonstrate the same. For though they teach that the *Moon* is next the Earth, because it has the greatest parallaxe: Yet that which is vulgarly reported of the Parallaxe of the Sun, *Venus* and *Mercury*, is not so certain. For latter Astronomers have observed, that *Mercury* has many times the same Parallaxe of the *Sun*, *Venus*

oft

oft times the same, and often times also a lesser. Which cause moved *Tycho Brahe* that most noble Astronomer, to invent a new disposition of the Planets; with which as more probable, most Astronomers at this day content themselves, til some body shal teach them better. But whatever Scituation of the Planets we shal allow, yet this remains certain, that it cannot be defended, unless we hold, as has been shewed before, that the Heaven is no solid body, and that there are indeed no Orbs therein of which it should consist. Which if it be not allowed, but we shal include the Stars in their Orbs; there must needs be penetration of bodies, if their motions be salved; which the motions of the *Sun*, *Venus*, and *Mercury* do chiefly declare. And most probable it is, which also I propounded before, that there is not a double motion of the Planets, one from East to West, another from West to East, but that all the Planets are moved from East to West; since Entities or Beings are not rashly to be multiplied, and without necessity: and since it suffices that the Stars have an internal principle of their motion; 'tis needless to ad an external and violent one. *Aristotle* saies rightly in his 1. *B de Celo ch.* 2. when he demonstrates, that a violent motion is contrary to a natural, and that a simple motion suits with the celestial bodies being simple; and that as the fire is moved upwards, the Earth downwards, so the heavenly bodies are naturally moved with a circular or wheeling Motion.

The distribution of the fixed Stars into Constellations.

Astronomers have reduced the most considerable and visible fix'd Stars, for better knowledg and memories sake, into certain figures resembling living Creatures and other things, which they cal Constellations. Which distinction of Figures and Constellations is of exceeding Antiquity, and was known either before, or soon after the flood; witness, not only the most ancient Poets *Hesiod* and *Homer*, but also the holy Scriptures: for in *Job* 9. 9. mention is made of *Arcturus*, *Orion*, and the *Pleiades*.

Now credible it is that the Astronomers were Authors and Inventers of these constellations who were studious of the Heavenly bodies, also Sea-faring men, as appears by the Southern Constellations, found out by the Navigators of the former Age and by them named, of which *Virgil* was aware, when he wrote,

Navita dum stellis numeros & nomina fecit.
When the Sea-men, numbred and nam'd the Stars.

Also Husbandmen, who in daies of old wanting the benefit of Calendars or Almanacks, were fain to begin their Labors, according to the appearance of certain Stars or Constellations. Whence also it happened, that some Stars have divers names, according as the Astronomers, Sailers, or Husbandmen cal'd them.

The Constellations differ from the twelve Houses.

Here also is to be observed, that the signs of the Zodiack or Austerisms differ from the twelve houses, each of which has thirty degrees, according to which the motions of the *Sun*, *Moon* and other Planets are reckoned, being obvious to the mind, but not to the Eye sight. But the signs of the Zodiack, are Stars visible to the Eye, reduced into certain Images, which Images, are not equal, but some greater, others lesser. For the Constellation of *Virgo* than *Libra*, and *Libra* than *Gemini*.

Now these Constellations are divided into those of the Zodiack, and those without the Zodiack, which are Northern or Southern. For the Zodiack is the pathway of the Planets, out of which though the Planets, excepting the *Sun*, do decline some whiles to the South, otherwhiles to the North, from the eccliptick which is the *Sun*'s path: yet they never wander out of the latitude of the Zodiack which consists of sixteen degrees. The signs of the Zodiack are *Aries*, the Ram; *Taurus* the Bul; *Gemini*, the Twins; *Cancer*, the Crab; *Leo*, the Lyon; *Virgo*, the Maiden; *Libra*, the Ballance; *Scorpio*, the Scorpion; *Sagitarius*, the Archer; *Capricornus*, the Goat-Buck; *Aquarius*, the Water-man; *Pisces*, the Fishes.

The Northern Signs are twenty one. The *Bear greater and lesser*; the *Dragon*; *Bootes*; *Ariadne her Crown*; *Hercules*; *Cepheus*; *the Harp*; *the Swan*; *Cassiopeia*; *Perseus*; *Heniochus*; *the Serpent*; *Serpentarius*; *the Arrow*; *the Æagle*; *the Dolphin*; *the Pegasus, or Flying Horse*; *The little Horse*; *Andromeda*; *the Triangle*.

The Southern signs as yet discovered are fifteen: The *Whale*; *Orion*; *Eridanus River*; *the Hare*; *the Dog*; *The little Dog*; *the Ship Argo*; the Hydra or *Water-shake*; *the Cup*; *the Crow*; *the Centaure*; *the Woolf*; *the Altar*; *the southern Crown*; and *the southern Fish*.

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But *Americus Vespacius*, and they who after him have sailed the southern parts of the world, do aver that the southern part of the Heaven, which has been yet unknown, is adorned with many very bright and remarkable Stars: which in imitation of the Ancients they have reduced into certain Constellations, by them thus named; the *Triangle*; *the Peacocks Tail*; *the Camel*; *the Indian Bee*; *the Crane*; *Noahs Ark*; *the Hornet*; *the Cross*; *Touta*; *The Water-snake*; *the Clouds*; *the Phœnix*; *the River Indus*. All which Constellations, both old and new, may at this day easily be known by the Globes artificially made for the same intent.

The Stars divided into tribes.

The Stars are also divided according to their magnitude, into six Orders or Magnitudes; and some are said to be, of the first; others of the second; others of the third; others of the fourth; others of the fift; and others of the sixt magnitude: which are every where reckoned up by Astronomers. Yet this is to be observed, that the Stars which are said to be of the same magnitude, are not all really of the same Quantity or Splendor; for the *Syrius* or *Dog-star*, does far outstrip all other Stars of the first magnitude.

What the milky way is

To these heavenly bodies belongs also questionless the Galaxia or milky way: now it is nothing but a Circle or Zone rather of a white color, to be seen a nights in the Sky, reaching from North to South; and dividing the Heaven into two Hæmispheres or half circles: the progress and carriage whereof *Pliny* in his 18. *of Nat. Hist. ch.* 29. has briefly described, and *Manilius*, more largely, in the first Book of his Astronomical Poem.

Touching the nature thereof, sundry men are of sundry minds. We, omitting the Poets fables touching *Juno*'s milk a part whereof fel upon this region of Heaven, as *Hercules* was sucking, as *Cælius Rhodiginus* relates in his 6. Book Ant. Lect. Ch. 7. or concerning the burning of the world by *Phaeton*; the fight of *Apollo* against the Giants; of the way of souls; of the seat of the *Heroes* or *semy-gods*; and the opinions of others reckoned up by *Aristotle in the* 1 *Meteor. Chap.* 8. *Plutarch* in his 2. *de plac. Philos. ch.* 1. *Picus Mirandula* in his *Exam. Van. Doct. Gen. l.* 7. *c.* 12. we shal in this place only consider whether the *Via lactea*, be somwhat that is Elementary and a true meteor, or some heavenly thing. *Aristotle* in the place newly alleadged, saies the *via lactea* is not in Heaven, but in the Air and consists of an hot and dry exhalation, gathered into that place, where are the greatest number of largest Stars, being drawn up by the said Stars; so that it is as it were a great Comet, and is perpetuated, by the continual and perpetual attraction of vapors, caused by the great abundance of Stars, in that place.

Whether the Via lactea *be a meteor?*

Nevertheless divers most noble Phylosophers and Astronomers, have rejected this opinion of *Aristotle*, for these reasons chiefly. First the perpetuity of the *Via lactea*: for seeing all meteors are somwhat disorderly made, nor is there alwaies matter enough, of the same figure, or color for meteors, nor is it alwaies carried to the same part of Heaven: the *Galaxie* or milky way, if it were a meteor would not be alwaies, nor of the same magnitude, figure, color; nor alwaies in the same place. Again if the *Via lactea* were not in the Heaven but in the Air, it would not be alwaies seen in the same place of Heaven, and about the same Stars, and would admit some parallaxe; after the same manner as Comets, which are in the Air, in this Region appear under one Star, in another Region under another. Howbeit, experience teaches the contrary, which witnesseth, that for so many ages of years the milky way has alwaies been seen, when the Sky is clear, in the same place, of the same greatness, shape and color, and in all places, about the same Stars.

Nor has the opinion of *Franciscus Picolhomineus* any place, who that he might some waies defend the vulgar opinion, saies that there is a twofold *Galaxie* or milky way; the one Celelestial, which is an abundance of shining Stars, in the eighth Sphere; the other the Effect of the former which is an abundance of dry exhalations, brought together into the shape of a Zone Girdle or Swath-band, in the upper Region of the Air, apt to be inflamed, placed under the Heavenly *Galaxie*, and preserved thereby; which by reason of the Light it receives from the Heavenly *Via lactea*, presents unto us the resemblance of a large white Way or Road. For though it be true, that a greater company of Stars, wil more heat and raise up more vapors: yet no sufficient cause can hence be assigned, why the *Galaxie* or *Via lactea*, should appear alwaies of the same Greatness, and Figure, and in the same place. For to the

the constitution of a meteor, there is not only required, the force of one or more Stars, but also matter, and that after a certain manner disposed: which because it is fluent and unstable, and is wonderfully changed by reason of the Influx of so many Stars, no meteor can be perpetual, constant, and alwaies return in the same measure and manner: nor does the *Sun* nor any other Star, yea though in the same position, or returniug to the same place, raise the same tempests, nor can they cause the breeding of the same meteors, by reason of the plenty or penury, or the various disposition of the exhalation.

That opinion therefore of others is more probable, that teach, the *Via lactea* to be a collection of very many and very smal Stars, which they cal *Sporadæ*, in the eighth Sphere, which because of their smalness and abundance, cannot be distinctly seen, so that their light being jumbled together, represents to our sight a white, or milky color. To this opinion others do also add: that this part of the Heaven is a little more compact than the rest, and by reason of its compactness comes neer to the nature of Stars, and therefore both by its own light, and by that which it receives from the other Stars, it appears more bright than the other parts of Heaven which are more thin and transparent, and is of a remarkable whiteness.

Divers Opinions of the Nature of Comets.

Next to the Stars we ranck Comets; and truly there is an extream diversity of opinions touching their Nature. *Anaxagoras* and *Democritus* held that a Comet was the gathering together of divers Planets, which because they were met in one place, by the mingling of their lights they seemed to make one Star. The *Pythagoreans* taught that a Comet was a Planet distinct from the seven vulgar Planets, which commonly lies hid under the Sun-beams, and by reason of the splendor of the neighboring Sun cannot be seen: howbeit sometimes, after long Intervals, it departs from the Sun and comes into sight, which also commonly happens to *Mercury*. *Hippocrates Chius* and his Disciple *Æschylus*, did consent with the Pythagoreans, that a Comet is a Star: yet herein they dissented, in that the former held the tail of the Comet to be a part thereof; but these latter held the tail to be vapors lifted up on high, and neer the Comet, receiving the raies and light of the Sun, and so representing a stream of Hair. Howbeit *Aristotle* reckons up and refutes these opinions in his 1 *Meteor. Cap.* 6. *Seneca* in the 7. *Quest. Nat. Cap.* 11, 12. *&c.*

The Opinion of *Epigenes*, which *Seneca* relates and refutes in his 7 *Book of Nat. Quest. ch.* 4. *&c.* was, that Comets did arise, when moist and dry exhalations being shut up in one Globe, by reason of the internal Spirit and the discord of contrary bodies, were agitated and whirled about. For then that same force of the Wind going round about, did by its motion inflame whatsoever it caught, and lift it on high, and that the shining of the Fire and the Comet did so long last til there was no more fewel to feed it, which fewel ceasing the Comet ceases. The Opinion of *Aristotle* though it differ in part, does mostly agree with this. For *Aristotle* teaches, that a Comet does not consist of Celestial but of elementary matter, namely of plenty of fat & thick exhalations, raised into the upper Region of the Air and there set on fire. *Plutarch* in his third *de placit. Phyloſoph. ch.* 2. besides the opinions of the Pythagoreans, *Anaxagoras*, *Democritus*, *Aristotle*, *Epigenes*, relates also the opinion of *Strato*, conceiving that a Comet was the light of a Star, comprehended in a thick Cloud, as it happens in Candles: and of *Heraclides Ponticus*, who said that a Comet was a Cloud on high enlightened with light from above. *Seneca* in *Lib.* 7. *Nat. Quest. Cap.* 22. conceives that a Comet is no suddain Fire, but reckons it among the eternal works of nature. *viz.* the Stars. For he conceived there were more Planets than Fire, besides the Sun and Moon, but that the beginnings and endings of their motions were not yet known; seeing they finish their courses at vast distances of time.

Late Writers do also differ in this point. *Scaliger* herein consents with *Aristotle*, in thinking that a Comet is made of Elementary matter: buthe denies that it is inflamed. For in his 79 *Exercitation* thus he writes: *I conceive therefore that a Comet is a Vapor drawn by the force of some Star into the upper Region of the Air; the nature of which vapor is not burning, but of a mixt matter, like a fume or steam, receiving the Sun-beams, and therefore visible, and letting them through, and by that means tailed.* *Cardan* whom *Scaliger* there refutes, had said, That a Comet is a Globe in

the Heaven inlightened by the Sun, through which the Beams being transmitted, do make as it were a tail. Because the Heaven is ful of Stars, which are not very compact, but when the Air grows dry, or for some other causes, they receive and retain light.

Bodinus in his Theatre of Nature *Lib.* 7. *P.* 217. thinks it better ingeniously to confess his ignorance, than rashly to affirm any thing in this Point, or to assent to most light opinions. Yet he in *P.* 221. *of the said Book*, seems to be almost of opinion, that Comets are the minds of illustrious men, which having for innumerable Ages had a great stroke on Earth, at last being about to die they perform their concluding triumphs, or are recalled into the starry Heaven, there to be as it were bright Stars: and that therfore, famine, popular diseases, and civil wars do follow, as if Cities and Peoples were forsaken by those most excellent Captains and Governors, who did pacifie the offended Deity. Other late Writers, who teach that the Heaven is not solid, but a fluid body like the Air, hold that Comets are not generated below but above the Moon; some say of exhalations carried thither, others of a part of the Heaven condensed, and by that means shining.

And these are the chief opinions of Phylosophers about the nature of Comets: in so great a number whereof, 'tis doubtless hard to judg which is the truest; nor wil the nature of this work, nor my design of Brevity suffer me at large to examine them all. Yet that it may appear, what we conceive to be most probable; their opinion seems to us most agreeable to truth, who hold that *all Comets have been, and appeared in the Region of Heaven which is above the Moon*: and if any man will call them new Stars, we shall not oppose him. Now that their abode has been in the Æthereal and not in the Elementary Region, may be gathered, chiefly by the regularity of their motion, the paralaxe, which they have had less than the Moon, as also by their equal duration. For since it has been observed that Comets have often endured a long space, and for six months together, in the same Quantity, and have alwaies had a regular motion: this can no way be attributed to a body composed of exhalations. For al such kind of Meteors, are made after an irregular manner, as may among others be seen in the Clouds, in which there is nothing perpetual, lasting, or regular. And the reasons which are brought for the contrary opinion, are but weak; and later Authors, do not without cause, call in question the observations of the Ancients; seeing there is need of great diligence to observe the Parallaxes. But whether they are bred anew by natural Causes, or are miraculosly produced by God, or whether they were before out of sight, and now at last appear, it is no easie matter by sufficient reasons to determine.

Yet this one thing, I think fit to acquaint you with in this place, that even the Ancients also did take Comets to be Stars, which sometimes appear, and then again become invisible, as may be manifestly seen out of *Hermes Trismegistus in his B. de providentia & fato*, where he thus writes *There is another kind which they call Comets, which appear but for a time, and a while after become invisible neither setting, nor being dissolved, and others become evident Proclaimers of Universal Events.* Now those have their place under the Circle of the Sun. When therefore somwhat shal befall the world, then they appear. And having appeared a few daies returning again under the circle of the Sun they become invisible, having shewed themselves in the East.

They say that Comets signifie wars; because hot and dry exhalations, do breed yellow choler in the bodies of Men especially of Kings, which afterwards make men prone to more violent motions, wrath, brawlings and wars thereof proceeding. Yet verily these are too remote causes of wars; the Polititians can tel us of neerer causes than these. And if wars depend hereupon, there is no need of many consultations, touching the composing of wars; we must fly to the Physitians, who by giving choler-purging medicaments may take away al wars, and pluck up by the roots all the Causes of Wars, out of the Bodies of Kings and Princes. Moreover, experience shews, that Comets have appeared, which have not been followed by any such events. This is for certain, since the Appearance or the Generation of Comets in the Heaven, is very rare and unusual, that they do undoubtedly portend somwhat, if not peradventure as Causes, yet as signs appointed by God to denounce his wrath against sinful men: whose particular signification, is nevertheless known

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only to God, and not reveal to any mortal Man. This indeed hath been found true by the Experience of all Ages.

Nunquam Spectatum impune Cometam.

Ne're did a Blazing Star appear, but a sad story follow'd. *An Hexameter verse*

And that after Comets great changes have happend in Enpires, so that *Lucan* rightly cal'd Comets, Kingdom changing Comets, and *Camerarius*, thus turned the old Latin verse into Greek; *Oudeis Cometes, Hostin ou cacon Pherei.*

But to what regions and Provinces they portend their bad tidings, 'tis scarse possible for a man to know, till the Event hath taught him.

Chap. 3. *Touching the Elements, in as much as being Simple Bodies, they with the Heavens, do make up the Bulk of this World.*

NOw the Bodies of the sublunary Region are two fold, simple and compound. The simple, are those which are called Elements, because the rest are made up of them. Now the term Element which the Greeks call *Stoicheion*, although it have sundry significations, yet it seems they may fitly be reduced to two principal ones, the one *General*, the other *special*. For generally it is taken for whatsoever is first in its kind and has nothing before it: in which sense 'tis defined by *Aristotle* in the 4. *Metaph. Ch.* 3. *That is called an Element, out of which first inexisting in the individual species, a thing is compounded into another species.* Moreover in a more special signification, Elements are the immediate principles of mixt Bodies, and thus are defined by *Aristotle* in his 3. *de Cælo. Ch.* 3. *t.* 31. The Element of Bodies is that into which the other Bodies are divided, wherein it is potentially or actually: but it self is not divisible into parts of sundry sorts. And in the signification we are hereafter to treat of Elements. *Element has a twofold signification.*

And these Elements truly have a *twofold* office and a double consideration. For their *first* office is, with the Heaven to make up this whol bulk of the world: and in this manner they are absolutely considered according to their essence, without any relation to mixt bodies: The *Second* is, to be the matter of mixt Bodies. And for the performance of both these Offices, peculiar qualities are given them by Nature. For that they might perform the *former*, they have heavines and lightnes: for the *latter*, heat and cold, moisture and dryness; whereby they can mutually work one upon another and make up a compound. Now the Elements are to be considered by us in this place, both waies. *Element in that latter sense have a twofold Office.*

Because the Elements do first perform that Office of theirs whereby they are carried to certain places in the world, and do therein naturally rest; we must first speak of their motion, and thence draw their Nature and number. The Elements are simple Bodies. For although, being considered as made up of matter and form, they may be termed compounds, yet in respect of mixt Bodies, they are called simple. For they are not made up of other Bodies which were before them, but themselves are the first Bodies of themselves existing in the world, of which all the other Bodies are compounded. Since therefore they are simple bodies, a simple motion is due to them. *The Elements are simple bodies and have a simple motion.*

Now there are *two* simple motions: the *Right* or *Streight*, and the *Circular*. The *Circular* belongs to Heaven: and therefore the *Streight* motion we attribute to the Elements, having therein experience to justifie what we do. For we see these Elements so called, and all things compounded of them, according to the Nature of the prevailing Element, go in a direct line to their proper place. Now direct motion is either *to the Middle*, or *from the Middle*; to the middle place of the world which as also the lowest, heavy things are carried; from the middle to the outmost part, *There are two simple motions.*

Why heavy things move downwards and light things upwards.

which is also the highest, light things are carried. For *light* things are such as being un-hindred do alwaies move upwards, and which alwaies swim at the top: and *heavy* things are those, which not hindred, are alwaies carried downward, and sink to the bottom of every thing. But what the cause is why some Bodies move downwards, others move upwards, we must now enquire, and see into the end and efficient cause of this motion.

The end of this motion.

As to the End, since Nature does nothing in vain, and all Natural things act for the sake of some good, we must not think the Elements are moved with certain motions to no purpose; but we must hold that every Element is carried to its own place, as to its perfection: whence *Aristotle* saies well 4. *de Cælo. c.* 3. *t.* 22. *For every thing to be carried to its place, is nothing else but for every thing to be carried to its own Form.* For the Forms of the Elements being of al others the lowest and most ignoble, and hardly able to defend themselves sufficiently from external injuries, their proper place is added to their form as an assistant to preserve the Body thereof, which as it were an external Form, supplies what is wanting to the internal Form. To its proper place, therefore, as to its own perfection, every Element is moved. And the perfection which they receive therein, is the preservation of their, Heat, Cold, Lightness, Heaviness, and consequently of their Form.

The Efficient Cause.

As to *the Efficient Cause of the motion of the Elements* Authors do many waies vary. Yet verily, if we shall rightly weigh the matter, and not wilfully intangle a a plain matter with difficulties, and rightly mind the sense of the question, it seems not so hard to answer thereunto. For if a man should ask, what is the efficient cause, that the Fire and Earth, actually existing by their forms, the former mounts right upwards, the letter moves downwards, unless they be by some other thing violently detained; we answer simply; that the Fire by its Form is moved from the middle of the world upwards, and the Earth by its form is moved to the Centre of the world downwards, for this motion is to them Natural and therfore it must also proceed from Nature, or an inward principle, which is their Form, and not from an outward. For this is proper to Natural things, to have in themselves the principle of their motion, as may be seen in the 2. *Physic. c.* 9. *t.* 48. Also the form of an Element which informes it, and is its Nature, is also the principle of its motion. Also to what hath been said may be added, that as *Aristotle* saies in 2. *Physic. c.* 3. *t.* 37. an effect actually existing, requires a cause actually existing; and that especially in effects, whose whole essence is in the present performance, as motion is: for the cause hereof being taken away, it is also taken away, nor can it ever be separated from its efficient cause. But the motion of the Elements is an effect actually existing. It requires therfore a cause actually existing; which can be no other then the Form. For this only alwaies actually exists with the motion: but those other causes which some do bring, as the Generator, the Remover of impediments, may be separated from motion, and while it is yet existing, they may either perish, or if they perish not, yet may they not coexist with the motion. Nor does what hath been formerly said of motion, hinder this opinion: that the Moveable is distinct from the mover; which seems not to agree to the motion of the Elements, if we hold their form to be their mover. For the Earth, when it is moved to the middle of the world, it is not moved, as having matter. For the matter in it self, is no more enclined to move upwards then downwards, but is indifferently capable of al motions; but as it hath a form, which determies and restraines the aptitude of the matter, to receive this form. And therefore seeing the matter is here the passive principle of the motion, it cannot be the active. And this doubt, truly, may be satisfied; if we distinguish betwixt an Agent with the transmutation of another thing, which is properly called an efficient, and requires alwaies a Patient different from it self: and betwixt an Agent only (as they say) by emanation of the effect, which does not by acting change another thing, but after the Nature whereof, the effect follows of its own accord, that as it were not acting; and such an agent is the Form in respect of al the accidents which are Naturally in the compound. For all accidents do of their own accord follow the form, without any motion or transmutation of the subject. That therefore which hath formerly been said concerning

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the distinction betwixt the moveable and the mover, is true of an Agent by transmutation. But an Agent by emanation is not necessarily distinguished from the Patient. Howbeit, even in an immanent action, or which is produced only by emanation, we may observe some distinction of Agent and Patient. For the Form, as the form acts; and suffers as it is in the matter. And therefore, in the motion of the Elements, the form as the form, is the Efficient Cause of the motion; but as it is in the matter, it is moved with it. For the compound is moveable, or is the subject of motion, which is distinguished from the form, in respect of the matter. For the matter also, is really distinguished from the form, And this is the true explication of this Question, Dextrously propounded, which must be by no means confounded, with other questions which border thereupon. For it is quite another question; Why an Element actually existing by its form, not hindred by any thing, tends to its own proper place, the cause whereof hath been already expressed; from this, why for examples sake, water which of it self moves downwards, fire being put under, begins to mount up in vapors; or, what is the Cause that a Stone which hung in the Air fastened to a string, as soon as the string is cut fals downward. For the cause of the former is the admixture of Fiery and Aery particles, which attenuate the water, and carry it with themselves aloft. And the cause of the latter is clearly, that which removes the Impediment.

Why water ever the fire moves upwards?

The Elements therefore not being hindred, are moved by their forms, as the internal and immediate cause, as hath been shewed: which formes as all others, cannot be perceived by sense, but are by us known and described by heavines and lightnes as accidents. For it is an usual thing to describe the hidden forms of things, which want peculiar names, by their proper adjuncts, which are better known to us.

Moreover what may be the Cause, why the Elements are moved successively and leisurely, whether only because of the resistency of the Medium, or through some other cause, comes now to be enquired. Some late writers are indeed of opinion, that there is a twofold resistency, one external, which proceeds from a ful Medium, which is the Cause that motion is slower then it would be, if it were performed in an empty space, if such there were: another internal, which proceeds from the Nature of the moveable, resisting the mover. Howbeit the opinion of *Aristotle* and *Averrhoes* is truer, who hold, that *the Elements have only an external resistency in their motion, proceeding from the Medium*; (For it being ful and corpulent, resists the mover in its motion, according as it is more or less thick) but no internal. For if there were any internal resistency, it should proceed either from the Form or the Matter. Not from the Form: for, it being the mover, does not resist its self in its own motion, but endeavors as speedily as may be, to carry the moveable to its due place. Nor from the matter. For it being meerly passive, and indifferent to receive all motions, and having no power to act, can also be no cause of resistency. All the swiftnes therefore and slowness of the motion of Elements, depends upon the proportion of the Virtue and power of the mover, to the resistency of the Medium. For when the force of the mover is much greater, then the power of the Medium to resist, the motion is swift: but when the power of the mover does not much exceed the force of the Mediums resistency, there the motion is slower: but where the mover does not at al exceed the force which the Medium hath to resist, there is no motion at al. Howbeit what hath been said must be understood only of the Elements which are simple Bodies, and have an internal principle of their motion. For in things moved by external force, the case is otherwise for they by their proper Nature resist the mover, and according to the excess, whereby their power is overcome by the power of the mover, they are swiftly or slowly moved.

Why the Elements are moved leasurely and by degrees.

From what hath hitherto been said the Cause may easily be rendred; why heavy and light things do move more slowly at the beginning and swifter at the end. For experience shews that an heavy thing falling from an high place, smites more strongly where it lights, then it would have done falling from a lower place. For though divers men think differently in this point: yet must we resolve, that the true cause hereof, is the abatement of the resistancy of the Medium; and the abatement of the resistancy proceeds from the forgoing motion, which augments the swiftnes of the follwing motion. Now why the precedent motion augments the swiftnes of that which follows, and why it abates the resistency, the Cause is this.

Why heavy and light things are moved more slowly in the beginning, and more swiftly at the end?

Every

Every movable is swiftly and easily moved through a Medium, which is moved the same way with it; and less swiftly through a Medium that moves not; slowly through a Medium which resists the moveable, and bears the contrary way: an Argument whereof we have in sailing with or against tide. And therefore, when any heavy Body begins to tend downwards first the quiet Air resists it, the resistency whereof is nevertheless overcome by the heavy Body, and drives the next part of the Air downwards: this first part of the Air being driven, drives the second part of the Air, next unto it. And therefore when the heavy Body comes to this part, and finds it not resisting but going the same way and furthering it in its motion, it begins to be moved more swiftly: and the Body being thus more swiftly moved, will more vehemently force and drive the third part of the Air: and it being before driven also by the second part of the Air, wil be more swiftly moved then the second, and will more strongly bear down the fourth part. When therefore the heavy Body shall reach the third part of the Air, finding it more vehemently moved downwards then the second, it wil also be therein more swiftly moved; and so it will yet more forcibly bear down the fourth part, being before prest down by the third, and when it comes to it, it will be therein yet more swiftly moved, because of the lesser resistency and the Mediums being moved the same way. And this swiftness of the motion wil be for the same Reason continually augmented even to the End. But that no obscurity may remain, we must know, that *Heavineß and Lightneß are taken two manner of waies*, Either for the first act or quality, by which a thing hath a propension to move upwards or downwards; or for the second act or operation, and impulse, by which some bodies are moved upwards, others downwards. Which two things the School-men to distinguish, they called the former *Gravitatem*, the latter *Gravitationem*: and hence 'tis said that Gravity in the Elements cannot be augmented, but Gravitation may: also, that the Elements in their own places are *Gravia* and *Levia*, heavy and light indeed, but they do not *Gravitate* nor *Levitate*, that is they strive not to go upwards or downwards.

Heavineß and lightneß are understood two waies.

Now the next thing is, that we search into the *Number of the Elements*, about which later writers do wonderfully differ. *I shall prove that there are four in Number.* And to prove the same I shall not bring many reasons; seeing our very sences will easily shew us how many Elements there be. For we perceive the Water, Earth and Air which fills that vast space above the Globe of the Earth, nor is the force of Fire unknown to us. 'Tis here my mind only to produce one reason which many use. There are two direct motions, one from the middle, another to the middle. Therefore, for these two simple motions there must be two subjects which are simple Bodies, one which is absolutely heavy, which is called Earth; another, which is absolutely light, called Fire. Now because 'tis the wil of Nature that the world should be one; and two contrary extreams cannot make up one compound; she alwaies couples the extreams by things of a middle Nature, and knits the last of the upper kind, with the first of the lower. And therefore in this case, a Medium is requisite. But this cannot be one only. For if that were allowed, it would possess the middle place betwixt the extreams, and so it could not be capable of a direct motion. For neither should it be truly moved from the middle, nor to the middle, but it should be Capable of both these motions, and so could not be called heavy more then light. And therefore we must hold that there are two Mediums, the one of which is light and moves from the middle upwards, but is in some respect heavy; which is called Air; the other must be absolutely heavy, and tend to the middle, yet in some respect light; which is called Water. There are therefore four Elements: *Fire*, *Air*, *Water*, *Earth*. There cannot be a fift, for the same cause why there cannot be but one Medium. If any one will hold there are more then five, he will be confuted by sense and experience.

The number of the Elements.

A question there is, *Whether these Elements are found pure in the World*: To which question we thus answer: If the Elements are considered absolutely in that simplicity, which is due to their Nature, and whereby they are the Rule and standard of mixt Bodies, they are surely to be found any where pure. But if they be compared with mixt Bodies, and the question shal be; whether they exist also by themselves, out of mixed Bodies, it may be said they are found sincere and pure, not indeed with an absolute purity, of which we spake just now, but with such an one, as they are capable of, compared to mixt Bodies. Howbeit the extream are purer then the middlemore.

Whether the Elements are found in the world pure.

Middlemore. Nor do the Elements, though they are not found exactly pure, lose their Name, so as to be called mixt Bodies. For those Bodies are only to be termed mixt, wherein there is so great a departure from the Nature and purity of Elements, that the Name and Form being cast away; they come to be now some different thing from the Elements, and receive a new and peculiar Name of some sort of Natural Body. But wherever there is so great an excess of one Element, that it transcends al comparison, with the rest that are joyned with it, in *that* the Name of Element is retained. *Which are mixt Bodies?*

It now remains that we speak of the Elements in Particular, as much as the Nature of this work will bear. And to begin with Fire, though many late writers endeavor to cast it from the number of Natural things, and take special pains to prove that it does not exist under the concave of the Moon: yet shall we subscribe to the remarkable consent of the chief Phylosophers, to reason strong enough, and experience it self especially seeing the Arguments brought to the contrary do all in a manner tend to prove, that this fire of ours, is no pure fire; whence notwithstanding it follows not, that there is no pure fire, nor that it is any where to be found: nor though all the properties of our fire do not agree to that under the Moon, does it therefore follow, that it is no true fire; seeing most of those things which are vulgarly attributed to our Fire, do agree to Fire not of it self, but accidentally. *Whether there is any Elementary Fire?*

For there is a great difference betwixt this Fire of ours which we daily make use of, and pure Elementary fire. For our fire of the Kitchen is not pure, but mixed with vapors and gross matter, and therefore it shines, it burns, it wants fuel. But that there is pure Elementary fire under the Sphere of the Moon, the great lightness thereof, and its prepetual endeavor to ascend, does argue. For *it is of all Elements the most light and thin Body*, As next in place to Heaven, so in Nature most of kin thereto, unto which also, if forced therefrom, or generated elsewhere, it tends as to its proper place, concerning which matter *Scaliger* in his 9. *Exercitation* thus writes. *The Smoak which ascends, hath very much fire in it. For it ascends not because of water: much less because of the Earth. Nor does that motion proceed from the Air; for it is already in the Air. What place therefore does it seek? That place verily which above the Air is due to the lightest of Bodies. And again, these are the principles of that demonstration whereby 'tis proved, that the Element of Fire is under the Sphere of the Moon,* viz. *Bodies Natural, Motion, Place. Of these are propositions certain, True, Primitive, immediate, thus made, the Causes of this Conclusion: that the place of Fire is in the upper space under the Moon, above the Air. Every movable thing is a Body: all Fire is movable,* Ergo. *Other two: Every body is in a place; all Fire is a Body,* Ergo. *Thirdly, as many more; Every movable moves Naturally to its own space; Fire is a Body movable,* Ergo. *And the two last, which knock the Nail to the Head. Every space to which a Body Naturally moves, is the proper space of that Body; The Fire moves Naturally upwards,* Ergo *the space above, is proper to the Fire.* *How Elementary Fire and Kitchen fire differ.* *Fire the lightest Element.*

The exceeding lightness of the Fire is attended by exceeding rarity, and it hath least matter of al the Elements, and amongst natural things, it comes nearest the Nature of Form; and therefore it hath the greatest activity of al the Elements. Yet, when it is pure, and of it self, it does not burn: but that our Fire burns the Cause is; in that it is condensed, and sticks in gross matter, whence its parts being condensed and brought into a narrow compass, attain the greater force. Or as *Scaliger* saies *in his* 2. *Exercitation, S.* 2. it hath the power of burning from the propinquity, Multitude, Cohesion, Coagmentation and union of its parts. An argument whereof we have in a red hot Iron, wherein the force of the Fire is greater, because of the condensation of parts, then it is stubble which consists of more spungy matter. The same appears if you set spirit of Wine on Fire, for you may draw your finger through the same without hurt, as also through the upper part of the flame; which in a red hot iron you cannot do. The said Elementary Fire is not of it self visible, no more than the Air, nor does it shine, unless it be received in a thick matter. *Why our Kitchinfire Burns?*

No found Phylosopher denies that the Fire does belong to the Elements, which make up this world and constitute mixt Bodies. For although *Cardan* hath endeavored to exclude the same from the number of Elements; yet is he well confuted *Fire is an Element.*

by

by *Julius Cæsar Scaliger* in his 9. *Exercitation.* For seeing, as he also teaches, in his 10. *Exercitation*, that heat which is a most manifest and effectual Quality, is accidentally in many things, there must of necessity be some first subject, wherein it is primarily and essentially: For nothing is in any thing accidentally, which is not essentially in some other thing, primarily and of it self. And truly, the first subject of heat is Fire, at first created by God with the other Elements, and furnished with its qualities. And there was never any time when Fire had not those qualities flowing from the Form thereof. But from the ignorance of the Creation of the world came, that Opinion of *Aristotle*, which he hath in the 1. *Meteorol. cap.* 3. where he saies: *Seeing the first Element is moved Circularly, the Bodies which are therein, alwaies that which is neerest at hand, being severed by the motion of the lower world and Body, is inflamed and causes heat. For thus we must understand the matter from the beginning. That Body which is under the upper Circumduction, being it is as it were a kind of matter, and potentially hot and cold, and dry and moist, and whatever other adjuncts follow these; such it becomes, and arises from motion and Immobility.* An absurd saying, truly, and unbecoming so great a Phylosopher! For what matter I pray you can we imagine actually existing of it self, which is potentially Hot, Cold, Moist, Dry, but actually receives these qualities from Heaven? For although some that they might stick by *Aristotle*, have fancied a twofold heat in Fire, one Natural, which follows the proper form of Fire; the other adventitious, which the Fire receives from the motion of Heaven; yet *Zabarella* in his 1. *B. de qual. prim. c.* 8. writes well, that the words of *Aristotle* do not receive all this Interpretation; for *Aristotle* saies, that all this matter of the lower world is potentially Hot, Cold, Moist, Dry, but is made actually so by motion and immobility. Therefore he allows no heat to the Elements, besides what they receive from the motion of Heaven. Yet he himself fals into a much more absurd opinion when he writes in *the following Chapter*: thus, *If any Man shall aske whether the first qualities are sooner or later then the Forms of the Elements, we must say, they are fore more and later in several respects. For in Original and according to the order of Generation, they are doubtless sooner, as the previous dispositions are in generation before the substantial Form, to the eduction whereof they are directed, but they are Naturally after the same, in as much as they are accidents. For accidents are after their substances. And in as much as they are Effects, but the Forms causes, I do not mean efficient causes but final. For qualities are produced in the matter, for the sake of substantial Forms, and are directed to them as to their End, as also they are conserved in the Elements by Heaven, that the Elements themselves might be conserved; so that the next final cause of these Qualities, is the Constitution of the Elements; but the remote and ultimate, is the production of mixt Bodies. For the Elements are made for the mixt Bodies, and to be their matter. Thus therefore Qualities may be said to follow the Forms of the Elements, in as much as the Forms are their final causes: but the qualities themselves, although they are preparations for the Eduction of Forms, they may not therefore be called the Causes of the Forms, but only the latter Effects; seeing accidents are Naturally later then substances. And therefore while they are together in the Elements, as Naturally conjoyned and substantial Forms and proper qualities; yet the Forms are in the first place, and the qualities afterwards, and so they are said to follow the Forms of the Elements; especially seeing, as we said before, they are given to the Elements by Heaven, for the Eduction and preservation of their Forms.* For if heat be a disposition previous to the reception of the form of Fire, into what matter I pray you is that disposition introduced, and in what matter is the Heat inherent, before the Form of Fire comes. And will the Form of Fire be idle, will it shed forth no quality? Thus one absurdity being gathered infinite do follow.

And the first subject of heat.

Not only potentially hot as Aristotle would have it.

Now the Fire of it self, is a substance most subtil, and thin, piercing through al things; which neither shines, nor is seen whilest it is pure and simple without any mixture. But when it is mixt with and is inherent in other things, it makes our vulgar Kitchin Fire, which differs not Essentially from the pure Element of Fire, but herein only in that it is mixed with some Heterogeneal matter.

It is a substance.

Thomas Fienus, indeed, in his *Apology* against *Sanctacruze*, *p.* 50. holds that this Fire of ours which we use, is only an accident. But the Reasons of that opinion are refuted in my 3. *Hypomne. Phys. Ch.* 1.

Not an accident.

And

And since this Kitchin Fire of ours, is useful to many intents and purposes, many authors write many things touching the Inventors thereof, as may be seen in *Plinies Natural History, B.4. Ch.* 12. and *Book* 6. *Ch.* 30. *in Vitruvius Book* 2. *Ch.* 1. But it is apparent by the sacrifices and by the story of *Tubal-Cain*, that the use thereof was known to the first Fathers of the world. Though it is not to be denied, but that the other uses thereof were later known to other Nations; and new inventions are alwaies added; as may be seen in Gun-powder, and sundry sorts of Fireworks, made thereof. *The inventors of Kitchin Fire.*

Now what the difference is betwixt Fire as it is potentially in mixt Bodies, and as it is actually hot, is not easie to explain, yet a thing necessary to be known. For Sulphur to feel to is as cold as a cold stick that hath no Brimstone in it; and a piece of Willow Wood dried is not colder to feel to then a piece of Pitch-Tree Wood. And spirit of Wine which contains much Fire in it, in coldness to feel to, is not inferior to the Wine it self. Yea in a flame which actually is hot, there is less quantity of Fire and of the smal particles thereof, then in Brimstone; since in Brimstone not set on Fire, that is united in a smal space, which is diffused in a great flame. In Gun-powder a mighty Quantity of Fiery Atomes lie hid, which is nevertheless cold to feel to. But the flame of the said Gun power, when it is set on Fire, burns exceedingly, though the Atomes are severed. This therefore is to be explained, why in a mixt body potentially hot, so many fiery Atomes contained and collected, do produce no actual heat; or, what it is that causes the Fire to heat. *'Tis either Potential, or Actual.*

The Former happens, because the Fire is mixt with other things, and is contained quiet under the dominion of a superior Form. But it heats actually, when it is separated from the rest of the Bodies, wherewith it was mixed, and being set at liberty, freely acts. Of which latter we shall now speak. *What makes the fire not to heat or to heat.*

But actual Fire is variously disposed. For if it be pure, it neither shines nor is seen. Of which *Scaliger* in his 9. *Exercitation. Meat roasted on Spits is not touched by the Fire we see, but it is touched by the Fire we see not: and it is so touched, sometimes, as to be burnt to a Coal.* In like manner, if a man hold his Hand over the flame, so that the flame do not touch it, yet his Haud wil burn. Fire also is perceived in quick Lime, when water is poured thereon, in dung when it rots, in Water, Oyl, Stones, Metals, which are heated. *Pure fire neither shines nor is seen.*

Now Fire appears to the sight and not only to the touch, two manner of waies; either in an hot Coal or Flame, as *Theophrastus* teaches in his *Book de Igne*, Now by a Coal is understood any Body red hot, that affords no flame. *It becomes visible two waies.*

But that we may rightly understand, what Flame and Inflamation is, we must of necessity presuppose some Principles. *Touching flame and Inflamation.*

The First is: That there is Fire in all Bodies, and that so as to retain its perfect Form, as I have demonstrated in *Hypomnem. Phys.* 3. Howbeit it is in a greater quantity in some Bodies in a lesser quantity in others. *Axioms.* 1.

The Second is: That actual Fire is alwaies Naturally moved. And whereas it is not so in mixed Bodies, the reason is, because it is contained quietly with other things in the compound under the dominion of an higher Form. For the Forms are the bands of things. 2.

The Third is: Fire is two manner of waies in compounds, the one as fixed, in Salts and other things not inflamable, nor combustible; the other, as volatile, so that by means thereof, the Body in which it is, may be inflamed; after which manner it is in Sulphur and al Bodies that partake of Sulphur. Upon which account, those Bodies which have Fire good store in them, are easily burnt by Fire, which, as *Scaliger* in his 9. *Exercitation*, speaks, *Gives back ashes to the Earth moisture to the water, and takes and keeps to it self, that which is invisible to vulgar Eyes, but cannot conceal it self from the Minds of wise men.* 3.

The Fourth is: That there is a Consent of Natural things, and things like are drawn to like. But contrary things Fly from one another *Ex Hyponem. Phys.* 1. *cap.* 1. 4.

The Fift is: That Fire hath a great similitude and likeness to things that are apt to flame; because they consist of Fire for the most part, and Fire does easily unite it self to them. 5.

The actuation of fire what it is. Hence we conclude, that the Actuation or actual breaking out of Fire, is the separation of that Fire which is potentially in mixt Bodies, from other things mixed therewith. I say potentially, not in respect of the First act, or the Form of Fire, which it hath really in the mixt Body, but in respect of the second act and operation thereof.

The manners thereof Which separation is made divers waies, as was said before, with flame, and without flame. Without flame in putrefaction, quick Lime, hot Coals; with flame, when Bodies are set on a flaming Fire.

What inflamation is. Of which to speak somwhat in particular, we say: that inflamation or setting on a flame, is, the breaking out of Fire from a Body apt to flame, and containing a Sulphureous Exhalation, caused by the touch of Fire near applied. For when Fire already actuated, does touch a body inflamable, the Fire therein, is attracted by the external fire, and by reason of similitude, moves of its own accord thereto, and unites it self therewith.

What flame is. Now flame is Fire breaking out of an inflamable Body, touched by actual fire, and sticking in the fume, as in a Sulphureous Exhalation, and shining therein, and moved therewith. And therefore *Aristotle* in 1 *Meteor. Ch.* 4. defines flame to be the *Boyling out of dry Fire* and in the 4. *Meteoral. Cap.* 9. *Burning Smoak.* For flame is Fire, but not pure, joyned with a Dry and inflamable exhalation. And when it is set on fire, the fire extends much farther then the flame. And therefore, as hath been said, meat roasted on spits, is touched indeed by the fire, but not by the flame, and a mans hand held above the flame, may be burned, and paper or a candle may be lighted also above the flame. Howbeit fire is then only seen, where being in a great quantity, hath a certain Fuliginous matter arising from the fewel, joyned therewith.

Actual fire is bred two waies Now actual Fire is ingendred, and at last breaks into flame, either by propagation, or by Coition, and union. The first is caused, when actual fire manifest to the sences, does touch another inflamable body, and sets it on fire, drawing out the fire which lay hid therein. The second is, when fire which lies secretly hid in mixt Bodies, is drawn out, without the contract of external fire, and being united does actually and manifestly shew it self.

The first manner is most common, when actual fire does set on fire other inflamable Bodies. For by reason of affinity, it is easily united to them, and draws out and unites to it self the fire in them. *Galen* in his *B. de usu respirat.* calls that same inflamable Body *the Root of Fire:* and *Theophrastus* in his *B. de Igne* termes it *the Beginning of Fire.*

Things which have sincere sulphur in them, easily inflamed. And because all things, are inflamed and kindled by means of Sulphur; those things that have sincere unmixt Sulphur in them; or though they have little thereof in them; yet are so disposed, that fire may easily insinuate it self into all their parts; such things I say are easily set on fire. For in the first place, if the Sulphur by much and pure, and not mixed in its smal parts with other things, but is of it self alone immediately obvious to the external fire, it is easily united thereto, because of its similitude: Contrarily such Bodies as have their Sulphur, though much in Quantity, mingled in its smal parts with other things, are not easily inflamed. Whence it happens that Pitch Wood is more easily kindled then Oak wood, though 'tis a question whether there be more Fire in Pitch wood then in Oak. For in the Former, the fiery Sulphureous parts are unmixt and at hand; but in the latter the inflamable fiery parts lie deep, yet are they discovered by their effects in warming of a Stove. By reason of plenty of unmixt Sulphur, spirit of Wine does soon take flame, and the purer it is and more separated from the Flegm, the sooner it is set on fire. But this is seen most of all in Bitumen, which is exceeding Sulphureous, and containes in it a spirituous matter, of kin to fire, and therefore is soon lighted, and conceives flame even far from the Fire, as *Pliny* in *Lib.* 2. *C.* 105. saies, Fire leaps to it wherever it sees it. And After this manner they say *Medea* set *Jasons* Concubine on Fire, as *Pliny* writes *in the same place.* For when *Medea* had given to *Creusa* a Crown or Garland smeared with Bitumen, and perswaded her to be present at the sacrifices, the Garland smeard with Bitumen, took flame from the Fire and lighted wood, and so burnt *Creusa.* And I remember, when I was making Balsam of Sulphur, and had put into a Glass Receiver, flower of Brimstone, spirit of Terpentine

and

and ſpirit of Wine, that they might ſtand in digeſtion, and left it to the care of a certain Student, to cover the mouth of the Receiver with a Glaſs Cover and cloſe it up with ſpaniſh wax; ſome of the ſpaniſh wax being lighted and falling upon the lid, the Spirit in the Receiver was ſet on flame, although it was hardly a ſixt part ful. Hereunto belong common Brimſtone, Gun-powder, Pitch, Aſphaltum, Ambar: Hence *Galen* relates in his 3. *de Temperam Chap.* 2. that a man in his daies, made a great boaſt of lighting a Candle after a wonderful manner, which he firſt put out & then applied it to a wal to light it, which he made ſhew to be done without Fire, which though ſome thought it to be a magical operation; yet when it was known, that the ſaid wall was ſmeared with Brimſtone and liquid bitumen, the wonder ceaſed. Like hereunto, is that which *Cardan* relates in his tenth Book *de Varietate Rerum*, of a certain man who would light Candles not perfectly extinguiſhed at the mouth of a certain Image, which was made on purpoſe and daubed with Sulphur and Bitumen or Petroleum, that ſo the Image might ſeem to vomit Fire.

Why dry bodies are eaſieſt inflamed.

Moreover, Bodies ſpungy and dry, though they have little ſulphur in them, yet becauſe they are dry, and the watry parts, which otherwiſe do moſt of all hinder kindling into a Flame, are abſent, the Fire eaſily unites it ſelf to the ſulphur which is in them, whence they come to kindle. Such bodies are, dry Wood, Torches, Straw, Stubble, dry Hay, Tow, Wool, Paper, Tutch-wood, Links.

Why viſcous and watry bodies are hard to take fire.

But that ſome things, as Oyl, Suet, Wax, which contain ſtore of Sulphur in them, are not eaſily ſet on fire, but need ſtore of fire to light them, as when they are boyling, or muſt have a wiek to cauſe them burn: the reaſon is, becauſe thoſe bodies are viſcous and clammy, and not ſpungy, and becauſe they ſtick together in their ſmal parts. Alſo, becauſe they have a watry Subſtance, mixed with their ſmalleſt parts. And the mixture of watry parts, does moſt of all hinder Inflamation. For Water as much as any thing hinders the breaking out of flame.

For ſeeing Water mingled with Wood, only by the roots thereof, does render them leſs ſubject to take fire, much more wil that Water do it, which is moſt intimately mixt with the ſulpur. But if a dry wiek be added to Oyl, Suet, or Wax; the flame or actual fire in the wiek, draws to it ſelf its cozen fire mixt in the matter cloſe by, but ſlowly, becauſe it cannot do it plentifully. For that ſame watrineſs hinders, which muſt firſt be removed, that the ſulphureous part may be lighted. Now this is ſlowly diſpelled: which alſo while it is in doing, the fire alſo flies away, and ſo it needs new to ſucceed it, which it does becauſe it is freed from the Water. And indeed in every body which feeds fire ſlowly, there is ſomwhat which reſiſts fire. For otherwiſe there were no reaſon, why the fire ſhould not be altogether ſuddenly inflamed, as it happens in Tow or Straw. And Brimſtone it ſelf affords a manifeſt example hereof, which does indeed ſoon take fire, and yet is long before it burn out, becauſe it has in it ſtore of acid ſpirit, which hinders the Inflamation.

Now the flame which we ſee kindled in any matter, is not alwaies the ſame; ſeeing the fire is in continual motion and flies away, a new fire comes freſh and freſh out of the thing burning. And therefore as *Ariſtotle* ſaies, *Meteor* 2. *The flame never continues the ſame.*

How the Fire is fed.

And whereas it is commonly ſaid that ſulphureous things, and whatever wil kindle, is the food of fire; *that* muſt be rightly underſtood. For it is not ſimply true, becauſe fire is a ſimple body, which properly is not nouriſhed. But in that the fire cleaves to the body inflamed, it is not becauſe it needs food, but becauſe through ſimilitude, it endeavors to draw out the fire lying hid in the body inflamed, and to unite it to ſelf, and ſo to multiply it ſelf. For every Nature deſires to multiply it ſelf, and there is in every thing an appetite of Infinity and Eternity, as *I. C. Scaliger* ſaies *in his 9. Exercit.* which is chiefly effected by union with its like. And therefore fire ſticks ſo long at leaſt to the body inflamed, as there is ſulphur and fire therein, which failing, it flies away.

The difference betwixt burning things that flame and thoſe that do not flame.

Alſo from the Premiſes the difference appears between a flame, and burning coals or other things which yeild no flame. Flame, as has been ſaid, is joyned with fuliginous vapors, and there is more fuliginous matter in a flame than in coals. For when the char-coals were made, the greateſt part of the fuliginous matter flew away. And becauſe abundance of fuliginous matter does choak the flame, yea and the fire it ſelf, and hinders the ſudden propagation thereof, of neceſſity the fuliginous vapor muſt have egreſs, whence it comes often to paſs that fire lies hid in a

close chamber, but flame arises not therefrom. But as soon as the door or window is opened, and a passage is given to the sooty vapors, it breaks forth into a flame. And because the coals themselves have yet in them some fuliginous matter, the fire consumes the coals no faster, than the fuliginous vapors can find egress. And therefore thongh the whol furnaces of Chymists are at once filled full of coals, the fire consumes no more of the coals, than is answerable to the egress of the fuliginous vapors, and so by opening or shutting, more or fewer, greater or smaller vent-holes, a man may moderate the fire as he pleases. For no more fire is kindled than the Prohibiter wil allow. Yea and coals may be so set on fire as that they shall not consume after this manner. Take a strong pipkin or stone pot, which will endure the fire, fil it with coals, and put on the cover and lute it round about, and when the lute is dry, put the pot into the mid'st of a fire, that the whol pot may be red hot; and then the coals wil be all on fire (and if any wil not beleeve it, he may by breaking the pot be sure of it) which being done, suffer the pot being taken out of the fire to grow cold of it self, then open or break the pot, and you shal find all your coals whol. The cause whereof is because as the fire entred in through the pot sides, so it goes out the same way, but the substance of the coals cannot pass the pot sides.

What fire needs a free Air, what not.

Howbeit we must here observe that it is not common to all fire, nor does it agree to fire as fire to be extinguished in a close place. For its known by Histories, that there have been lights which have burnt long ina close vessel: but this is the property of some sort of fire only, namely of that which comes out of a mixt sulphureous body, as Wood or the like, with fumes and exhalations. For the flame only which arises from such bodies, being shut up is extinguished. For since in a continual flame there is a resolution of mixt bodies, and the mixt body is resolved into other things whereof it was compounded, and a body resolved requires a larger space, than that which is close compacted, it happens, because there is no place for the fuliginous vapors which steam out, part oppresses part; and because naturally there is no penetration of dimensions, while the compound is hindred from being resolved or loosened, the cause also of the dissolution is stopped, which is the actual fire.

And all these things which we have said, appertain to the first manner of generation of Fire, *viz.* when actual Fire is applied to a combustible Body, and a combustible or inflamable body is kindled by Fire put to it.

The sundry uses of this fire.

By this manner of Fire many things are made and prepared for the use of man: and hence come not only the melting and never breaking Fires of Chymists and other Artists, and those which are used in Kitchins, Stoves and Chambers to warm us; but also Candles, Torches, Links and Lamps. Candles, Links and Torches are made of Tallow, Wax, Pitch, Rosin, with wieks of Cotton and Cordage. Lamps are made of Oyl with Cotton, in a Glass or other Vessel. They are made to give light in dark places. Oyl of Olives, Line-seed, Rape-seed, Hemp seed, are vulgarly used; also Lamps may be maintained with spirit of Wine or other spirits. Now that which primarily and principally burns, is the Oyl or other inflamable liquor, which the wiek draws, which is hereby apparent, in that there are some snufts that wil not consume with Fire, such as those made of the Wood Asbestum, of which *Pliny* speaks in *his B. 19. ch. 1. and 2. and Book 36. ch. 19.* and of the stone Amiantos, of which *Dioscorides* speaks in his 5. *B. ch.* 147. as also of *alumen plumosum.* But if the wiek be combustible, it is secondarily both inflamed and burnt up.

Lamps burning in water.

And although Water do quench Fire, yet Lamps may be made, which burn in Water and are extinguished in Oyl; if namely the Wiek be soaked in liquid Vernish, and put into Water and so lighted: for then it wil burn in the Water; but if Oyl be powred to it instead of Water, 'twil go out.

Durable Lamps.

And that the Oyl may burn the longer, certain metallick substances must be mixed therewith. So if you take one pound of red Lead, half a pound of Ceruss, four ounces of quick Sulphur, common Oyl two pound, and mix them all in a Mortar by the Fire side, leisurely stirring it sometimes, and then digest them Eight daies in a Glass retort, and at last distil them, you wil have an Oyl which wil last a long time in Lamps. Or thus: Take Liturige one pound, live Brimstone four ounces, Loadstone one ounce. Let al being poudred be incorporated with two pints of Oyl Olive.

live. Let this mixture digeſt ten daies together; and let it be ſtirred about once a day, afterwards diſtil it with a retort, and uſe the Oyl for a Lamp. If you would uſe ſpirit of Wine for a Lamp, to make it laſt long, pour it upon equal parts of unſlak't Lime, crude Tartar, and Brimſtone, and diſtill it once through a retort. Or pour ſpirit of Wine upon equal parts of unſlak'd Lime, crude Tartar, and common Salt, and ſo diſtil it. Concerning the Lamp of *Ammon* ſee *Plutarch* in his Treatiſe *De defectu oraculorum.* Alſo *Cardan* deſcribes perpetual Lamps in his 10. *de Rerum Varietate* and in his 1 *de Subtil. de principiis rernm, Caput* 10.

And ſo much touching the firſt manner of the Generation of Fire, to which if any man wil refer that alſo, which is cauſed by the Sun's beams, I ſhal not quarrel with him. For if the beams of the Sun be ſo collected in a burning Glaſs artificially made to that end, that meeting in a point, they ſet on fire a combuſtible body, they do the ſame thing that fire applied does. *Hitherto belongs the propogation of fire by the Sun-beams.*

Moreover, There are alſo other waies, by which the fire which is potentially in a mixt body (that is to ſay, which actually and according to the form, is really in mixt bodies, but is not liable to the ſences, but lurks inviſible) may be called out of the ſaid mixt body, ſo as to become manifeſt to the Sences. *Seneca* in his 2 *B. of Nat. Queſt. num.* 22. writes, That Fire may be made two waies, one way is if it be forced out, as from the ſtriking of a Flint; another by rubbing, as when two Sticks are rubbed together a long time. But indeed there are more waies, and at leaſt three. For Fire is made. 1. By putrefaction. 2. By the flight of the Contrary. 3. By motion: to which ſome ad a fourth mentioned by us in the firſt, *viz.* the Sun-beams. *Or by Coition and Union.* *Which is done many waies.*

In the firſt place, ſince in Putrefaction the Heat and fire which lurk in the mixt body exhales, and thereby become united, by putrefaction, Fire is ſomtimes kindled. And it is known to Country-men, how hot an heap of dung wil grow, ſo that the ſtraw therein wil be quite burn'd. So they relate out of *Theophraſtus*, that a Ship laden with moiſt Cloaths, conceived Fire and was burnt up. Nor is it unknown that heaps and Stacks of moiſt Hay and Corn have been burnt up. Howbeit in matter putrifying hardly can there be ſo great an heat raiſed, that the matter ſhould flame, unleſs it gather ſtrength elſwhere. An example whereof *Galen* has in his 3. *de Temperam Cap.* 2. where he writes: that Pigeons dung was caſt neer the window of an houſe in *Myſia*, in the middle of a moſt hot Summer. The dung therefore putrifying, and being heated by the Sun, ſent forth a fiery vapor, which ſet on Fire the boards of the Window which were ſmeared with Rozin, and at laſt burnt the whol Houſe. 1 *By putrefaction.*

Secondly, Fire is collected and kindled by flight of its contrary; a manifeſt example whereof we have in Quick Lime, upon which if water be poured it grows ſo hot, that it has been ſeen ſet wood on Fire that has been by it: which comes to paſs, becauſe the fiery atomes or ſmal particles of Fire which lie hidden in the Lime, whiles they fly from the Water contrary to their nature, come to be united together, and ſo to operate. Howbeit there is a diſſent amongſt Authors touching the Reaſon of this growing hot of Lime when Water is poured upon it. *Theophraſtus* in his Book *de Igne*, writes thus thereof: *Seeing Heat is not without moiſture or exhalation, therefore Lime burns when Water is put to it, rather than alone.* He ſeems to think, that Fire lies hid in the Lime, but that it is not pierced without matter; but Water being poured upon it, it is brought into act, and exhales with the vapor, and ſo affects the touch. *Petrus Aponenſis* conceivs the Cauſe to be, that the Heat being kept in by Antiperiſtaſis of the cold Water becomes more forcible. *Jul. Cæſ. Scaliger* in his 5. Exercitation Sect 9. thus writes: *In the paſſages of the Lime, the natural moiſture being conſumed, there lurks Fire: which flying from the Ingreſs of the Water, and thruſting it ſelf into the ſolid parts, it collects it ſelf, and becomes ſharpened by condenſation: for the piece of Lime, whoſe half only is covered with Water, as far as it is out of the Water grows hot, receiving into ſelf that Heat which is baniſht out of the other parts.* The Comentator upon *Theophraſtus*, *de Igne* blames *Scaliger*, becauſe in the Lime it does not ſo fall out that one part receives the Water, another part the Fire. For the Water ſoaks through, and every where fils all the paſſages, nor can this Collection and denſation of the Fire be made in the inner part of the Lime as in a Tower of Refuge. 2 *By flight of the Contrary.* *Why Lime grows hot when waiis powred upon it.* *Theophraſtus.* *Pet. Aponenſis.* *J. C. Scaliger.* *The Commentator upon Theophraſtus.*

And

They are examined. And in good deed, true it is, that ſome humor exhales out of the Lime, with the Fire. But thus a cauſe is not ſhewed, why at laſt the fire begins to exhale with the Water, and why in other hot Bodies, water poured on does not produce the ſame effect. Nor hath the Antiperiſtaſis of *Petrus Aponenſis* any place here, ſince experience teſtifies that the heat is rather poured out, then that it gathers it ſelf inwards. So alſo there is no ſuch Concentration of the Fire as *Scaliger* imagines; for as ſoon as ever the Water is poured on, it pierces into all parts of the Lime.

The Authors opinion. I conceive therefore that the opinion firſt propounded is the trueſt. Namely, In the Lime there are many atomes of Fire, not ſo much they, which the violence of the fire could not draw out, as thoſe which have inſinuated themſelves during the long time of its burning in the Kil. For Chalk is of a Spungy Body. Therefore water being poured on, it penetrates into all parts of the Lime, which the fire avoiding, as contrary thereunto, it exhales, and ſo becomes ſenſible. And becauſe the Lime contains yet ſome moiſture in it, whereby it hangs together, that unites it ſelf to the water poured on, and leaves the Body, whereupon the Body of the chalk is diſſolved and reduced to pouder.

Mixtures made to burn with water or ſpittle. Upon this Ground, mixtures are made which are ſet on fire, being wet with water, Yea, or with Spittle: *viz.* If a like Quantity of Ship-Pitch, Greek Pitch, Sulphur, Tartar, Niter and Petroleum be mingled together, and double the weight of all in unſlak't Lime, be added, and all made up with the Yolks of Eggs, and ſome daies digeſted in Horſe Dung or in *Balneo*. This mixture is ſet on fire by Rain or any other moiſture. The like mixture may be made of Unſlak't Lime, Sulphur, a little Gum Arabick, and Line-ſeed Oyl: whereof bals being made, they wil be ſet on fire by Water thrown on them. So, if you fill an Egg-ſhell half ful of unſlak't Lime, and put Gum-powder on the top and ſtop the hole with wax: Then the ſaid maſs Thrown into cold Water, will be ſet on Fire.

3. *By motion.* Thirdly, Fire may be raiſed by motion: which comes to paſs, by the mutual rubbing together of two Bodies, which have Fire in them. For by rubbing and motion, the Fire which did lie ſtil in mixt Bodies, kept in bondage by an higher form, and throughly mixt with contrary things, is moved, and ſo gains motion and activity. And this betides more eaſily, if on woods now a while rub'd one upon another, Gun-powder, or Powder of Brim-ſtone or ſuch like be ſtrewed. So *Pliny* in his 16. *B. Ch.* 4. writes that *the Mulberry Tree, the Bay-Tree, and the Ivy and all Trees out of which Fire is gained, are hot Trees. Spies in Camps and Shep-herds have found this Experiment, becauſe they have not alwaies a Flint at Hand to ſtrik Fire. They Rub therefore one piece of Wood againſt another, whence Fire ariſes, which is received on tinder, a dry Muſhrom or withered leaves of Trees. But nothing excels Ivy which muſt be rubbed with Bay, or let the Bay Wood be rubbed with the Ivy. Alſo the wild Vine is approved in this caſe, not that which is cal'd Labruſca, but another ſort, which Climbes Trees like Ivy.*

4. *By the Sun beams.* Fourthly, Some refer hither the manner whereby Fire is kindled by the Sun-beams, of which we ſpeak above, in the firſt manner of gaining Fire. Whereof we allow every Man to Judg as he pleaſes. The thing is of it ſelf manifeſt and wel known, that by burning Glaſſes and other Glaſſes, Wood, Paper and other dry things are ſet on fire. With ſuch kind of Glaſſes *Archimedes* ſet on Fire the Enemies Gallies and burnt them up. Of which ſee what the Teachers of Opticks ſay, and *Johannes Baptiſta Porta*. Yea, and the Raies of the Sun may kindle fire without any Glaſſes, and experience hath ſhewed, that woods and bituminous Lands and Seas, have been accidentally ſet on Fire by the Sun's Beams.

Scaligar, refers to the Head the manner by attenuation of the Air: but he is confuted. *J. C. Scaliger* in the ſame *Exercitation, Sect.* 1. hath yet another manner of the generation of Fire, and conceives it may be made out of attenuated Air; where thus he writes: *We muſt confeſs that out of the Air moved, ſmitten and attenuated heat may be cauſed. Which if it proceed it turns to the ſubſtance of Fire, and that by Reaſon of the attenuation of parts.* But that this is falſ, does thus appear, that Stones and the hardeſt Bodies ſmitten together, do not cauſe any ſparkles of Fire, unleſs they have ſtore of Sulphur in them. And the Sulphur which is forced out of flints may be perceived by its ſmel. Moreover the Air cannot be inflamed, either by rubbing or any other way, but this is the property only of mixt Sulphureous Bodies. And if the Air it ſelf could be ſet on Fire, this lower Region of the Air had been long a go burnt

burnt up, at the burning of great woods and Cities. *Aristotle* truly, in his 2 *de Cælo, Ch.* 7. *Text* 42. and 1. *Meteor, Text* 3. Writes that the Air being moved is set on fire, and that arrows by motion grow so hot, that the Leaden points have melted. But I do not believe the truth of such reports. And if the Leaden points of darts could melt, much more should bullets grow hot, that are shot out of Guns, which they do not. And *Pareus*, in his *Apologismus Primus* saies that bullets shot against an hard Stone have been presently taken up without hurting a Mans Hand. And if Leaden points of darts or Leaden bullets, did grow hot with motion, much more would wax grow hot; and yet experience hath taught us that a bullet made of wax shot out of a Gun hath not melted, but hath gone through a boord two fingers thick.

Whether the points of darts do melt.

So much for the manners of the generation of Fire. Contraiwise Fire goes out, especially flame, when either the inflamable matter fails, or though it be present, it is hindred from flaming, and the Fire not suffered to come out of the mixt Body.

Contrariwise, Fire goes out.

For in the first place, when the inflamable Body fails, the flame ceases, when all the Sulphur which was in the Body is consumed. So when Tallow, Wax, or Oyl fail, the flame dies in the Wiek and Lamp; and when the wood is quite burnt and reduced to ashes, the Fire goes out; because that which was there before, flies away, and no more follows it. For *Flame is alwaies in generation and being bred it perishes immediatly*, as *Theophrastus* speaks in his *Book de Igne*. For while the fire is made by consuming the fewel, when the fewel is gone the fire goes out. For the fire properly does not die or perish, but flies away: yet because it sticks so long to the inflamable Body, as long as there is any thing to be kindled and burn, when that fails, it is thought to die. This first manner of extinction, which is caused by defect of fuel, is by *Theophrastus* in his *Book de Igne* called, *A Corruption allmost Natural, and most properly so called.*

1. *Either through deffect of inflamable matter.*

Touching the kindling and going out of Fire, *Galen* hath an excellent place *in his Book de respirat. Cap.* 3. Where he writes: *All flames are moved with a double motion, the one from the matter, out of which they are kindled, by which they mount aloft and spred abroad every way; the other contrary to this, is to their beginning and their Roots as it were, by which they settle and are contracted. For if you light a brand on the very top, the fire comes suddenly to the lower parts; and if after you have blown out the flame of a candle, and you shall hold another candle over the Smoak of the snuf, you shall see it presently lighted, which could not so fal out, if the fire moved only upwards.* And he adds that this is the cause of the said double motion, *seeing* (saith he) *every flame is most speedily corrupted: for it is alwaies scattered by the ambient Air, therefore it is necessary that its generation should also be very quick; otherwise it would not last the least moment. Now the generation of all flame comes out of the matter, therefore it hath not without cause given it by Nature, not only a motion outwards from its proper principle, but one contrary thereunto, turning towards its own proper principle. And all flame must needs be corrupted, if it want either matter, or one of these motions.* In which place of *Galen*, those two motions of flame, are diligently to be considered. First, The Fire is carried to the Body inflameable, and the matter, or Root, as *Galen* cals it, by reason of affinity, and it goes on al sides: the other is whereby the fire which is drawn out, is naturally carried upwards.

The double motion of a flame according to Galen.

The cause of this motion.

Now the waies whereby the inflameable matter being present, the flame nevertheless decaies, are many, which all of them have this in common, that in the extinction, the actuated fire goes away, and no more actuated fire does succeed it, from the mixt Body inflamed.

2. *Or because of no generation of new actuated fire.*

This proceeds first from suffocation; *viz.* when as the fire breaking out of the inflamed Body with the Smoak, finds no place to receive it. For then the fire ceases to be moved in the fume or Smoak. For seeing, as was said before, two bodies cannot be in the same place, least there should be a penetration of dimensions; and in the inflamation, of mixt Bodies, many exhalations go away with the Fire which fire which raised them; if they find no place to receive them, their evaporation together with the flame is hindred, by the necessary working of universal Nature. After this manner, all things that deny place to the Fire and the exhalation joyned therewith, do extinguish the fire, and stifle the same: which happens when the flame and fume are so shut up, that they have no free egress, nor place to hold them.

which comes to pass again.

1. *Either by suffocation*

Its

Hereunto belongs a soextinction by thick Air.

Its also a kind of suffocation, when the flame is extinguished by thick Air and exhalations; which comes to pass in the quarries of metals, the pumpes of Ships, and when Beer and new Wine works. For seeing the Air is then filled with thick vapors, it cannot contain the flame with its exhalation, whence its motion must needs be stopped and choaked in its Root.

Also the compression of the Wiek.

To suffocation also, compression may be referred, when the wiek being compressed, the flame of Candles is put out unless any one will refer this to the following manner, whereby fire is violently separated from its Fuel and Root as it were.

2. *Or by discussion and dissipation*

Secondly, A flame is extinguished by discussion and dissipation, when the flame is pluckt away and so departs from its fuel and Root, before new fire can follow, and when the fire is taken away, which drew out the fire in the mixt body. After this manner Torches are blown out by Winds, and we blow out Candles and Lamps with our Breath. And seeing by the blast of ones Mouth or by Bellows, flame is raised, and the fire in Coals turns to a flame, we must enquire the cause of these different effects. Where we are to know; if a little flame do only stick in the surface of the Body, it is soon extinguished by blowing, whereby the incendiary, and the fire into which the mixt Body is resolved, are soon taken away. But if the fire, actuated by blowing, is driven into the inner parts of the Body inflameable the fire is more and more encreased. Thus, by blast of the Mouth, and of the Bellows, the fire is droven into the inner part of the Coals, and flame is raised, which when it hath taken deep root, it is not easily separated, but the fire desirous to preserve it self, alwaies goes more inward, and by that motion, more of the hidden fire is actuated. Which is manifest in Coals. Hence it appears, why as *Theophrastus* saies and experience teaches, Lamps do consume more Oyl, if the Wind blow upon them, then they do when the Air is stil, and torches also are sooner burnt out, when the wind blows. For seeing the flame is prepetually generated, and the Wind or other blast discusses the flame gennerated, the fire sticking close to its principle or Root, does more greedily and powerfully draw out what ever is therein inflamable, and turnes it into flame.

Why flame is both raised and extinguished by blowing

When and why the flame in the wiek, is extinguished & blown in again.

Hence also a cause may be rendred, why the flame being extinguished, is again excited by blowing upon the snuf. Where you must observe that this does not alwaies happen, but somtimes only, when the snuf is large and ful of fire, like a coal. For then, as burning coals by the blast of bellows, do send forth a flame, which otherwise, of themselves they would not do: so also the fire being in great quantity in the snuf, by blowing conceives flame. But if the snuf after the flame is blown out, have not much fire in it, and be not red hot, 'twil be in vaine to endeavour to blow it into a flame,

Why the fire of a flame, is more powerful then that of burning coals.

This also is to be observed by the Way: that the fire of a flame, is much more vehement then that of Coals, and that not without Cause. For all the strength of Fire is in motion. And experience it self witnesses the same. And therefore Gold-Smiths do most readily melt their Gold by a Lamp, the flame whereof they direct upon the Gold by blowing. And others also that work in metal, and amongst them, belfounders do rather use the fire of flame rising from wood, then Coals, and if in other melting fornaces they use Coals, they use the continual blast of bellows to make them flame.

Or by hindring the afflux of new fire.

There is yet a third way, when the flame, though the matter of fire be present in an inflameable body, is extinguished, because that which is first bred, flies away; seeing flame is in perpetual motion, and new fire is hindred from coming out of the inflameable body, or the actual fire is hindred from drawing more out of the inflameable body, or as *Theopraſtus* speaks somwhat shuts up and stops the beginning. Which how it comes to pass, we are now to enquire. which how it comes to pass, must be enquired unto. Some men may refer this to the presence of that which is contrary, which when the fire perceives, it flies from it, and ceases its motion. But, Seeing not only water, but also Oyl and spirit of wine, too abundantly poured about the flame, yea, and Ashes, Sand, and what ever covers the inflameable body, that the Flame which cals out the lurking fire, cannot touch the same, puts out the flame; and 'tis not only contrarity that makes to the extinction of the flame. For the fire in the flame flies away, when it can no longer touch the Body inflamed. And though the Body, which interposes it self, be it self also inflame-

Whether fire be extinguished, by presence of its contrary.

able;

able; Yet, If either by means of the great Quantity thereof, or by reason of the admistion of another Body, it cannot set that body on fire, nor change it into a flame to succed, the former flame flies away, and so no other coming in its place, the fire is extinguished. Yet, because of al things water doth most easily extinguish fire; if any one wil have it, that it puts out fire, not only by interposition of its body, but also by its contrariety which it hath to Fire, I shal not contend with him thereabout.

Why some fire burns under the Water.

But how it comes to pass that some fire burns under water, is an obscure question, nor that I know of, sufficiently explained by any Man. For al inflameable things wil not burn under the Water. For Rozin, Bitumen, Frankincense, Yea, and Brim-Stone it self, if being set on fire they be put into water, they are easily extinguished: and other things even when they are not on fire wil not admit of water, as Oyls, Tallows, Fats. And if these be much heated, and then water poured upon them, there arises a great fight betwixt them and the Water, and the fire flies violently away with a great noise; so that experience hath taught, that fires have been caused by pouring Water on such fat things when they boil. If therefore mixtures be made of such things so fatty, which exceedingly resist water, adding such things as do most of all cherish fire, and keep it from flying away, then those mixtures will burn even in the Water. For a part of such a mixture being inflamed, does vehemently drive the Water from it self, and therefore such things burn with a noise, and hinder the water from piercing into the burning body, and the other things do continually supply matter to the flame.

A Torch that cannot be quenched.

A Torch that wil not be extinguished by Rain or Wind, may thus be made. Take *Colophony and Wax of each six pound, Turpentine two pound, Tallow one pound.* Mix all over the fire. And in this mixture dip Wicks to make Candles, or Cords to make links, let them boil a little and then take them out and cool, and wreath four together for one link. Which must be covered with *four pound of Wax and one pound of Turpentine.*

A Candle that will burne in Water.

A Candle that will burn in water may thus be made. Take *Wax half a pound, Brim-stone, unslak't Lime, Turpentine, Salt Ammoniack, of each two ounces, Petroleum one ounce, Camphire half an ounce.* Mix them and make thereof Candles, which if they be lighted and thrown into the water will burn nevertheless.

Flame is also extinguished when a greater is applied to a lesser.

Besides the manners and waies already reckoned up, whereby fire may be extinguished, *Theophrastus*, in his *B. de Igne*, hath yet another, *viz.* When a greater fire is put to a lesser. So we see, a great Candle lighted and put to a lesser, puts the lesser out. But then the lesser flame indeed is extinguished, but the fire in the Snuf is not put out: and the fire and flame do not go away, only the lesser flame goes to the greater, because of affinity, and is thereto joyned; or the lesser flame is drawn to it by the greater.

Of the operations of fire.

And that we may say somwhat also of the effects and operations of fire; Fire is indeed essentially one and the same, but according to the diversity of the matter wherein it is, it workes diversly. *Fire is most hot in a solid and Earthy Body*, saies *Theophrastus*: but in a thin and rare or spungy body, 'tis less hot. And *Scaliger* in his 9. *Exercitation*: *Fire in Iron is most vehement by reason of its density, in wood less vehement, weaker in Wooll and such Paper as we use; in a flame it is so dilute that we can draw our hand through it without hurt; in Aquæ-vitæ, on fire the flame is so thin, that it will not burn a cloath dipt therein.* Yea, And the same *Scaliger* in the same place saies, that the fire burns not of it self, but by accident, *viz.* Because of condensation. Howbeit, It is a question obscure enough, whether fire of it self burns, and whether some fire be hotter then othersome. *Cardan* hath invented some causes of this thing, which may be seen in *Scaliger*. Now that this question may be more rightly explained, *Scaliger* gives us light, in the same place, who saies the common manner and cause why fire is more vehement then fire, is the frequency of its parts, their Coherence, Propinquity, Coagmentation, Cohesion and union; for in a more compacted matter very many parts are contained in a smal place.

Why some fire is more vehement then other some?

The opinion of Scaliger.

Andreas Libavius indeed opposes this opinion of *Scaliger* in his *Comm. Alchym. Part.* 1. *Lib.* 2. *Cap.* 12. And feigns I know not what intension of substances and qualities, and objects divers things of little validity against him, scarce rightly stating the Controversie. For first he saies, when stubble is loose and spred abroad,

Libavius opposes the opinion of Scaliger.

the fire Flams and wanders at large, and we must say its heat is less because of the dispersion of parts. Take them therefore in your hand, twist them and twind them together, yet the fire becomes no stronger: but the answer is easie. The stubble it self, whether spread abroad, or in a bundle, does not change its Nature, but continues spungy. And therefore it stirs up the same degree of fire, save that when it lies scattered it cannot afford so joynt a Flame, seeing much Air comes between, as when it is gathered together. Again, he saies, that fire burning freely in a spungy piece of Wood hath more furtherances to its action, then in an hard and solid, although you imagine both of them to be totally inflamed. The fire of loose Coals is more spirituous, and more blown through then that of hard Coals, although a greater impression seems to be made by the latter, if you touch them: yet it hath less spirit, it receives less nutriment from the Air; and because it is more shut in, it is more weak, though more lasting in regard of the strength of the matter.

Libavius his objections answered.

But *Libavius* seems, not to have been well acquainted with the Nature of fire, and there are many things in these objections not agreeing with truth, also several questions are mingled together. For the question is not, what material does more easily take fire, and in which fire is most easily brought into act, and which burns most freely. For we grant that al these things are true of Spungy bodies. But the question is, in which the fire burns most, in a rare or a dense body. And we say, that fire does burn more vehemently in a compact and dense body, as experience shews. For a man may without dammage draw his finger through the flame, but if he do but touch a red hot Iron, he is burnt in a moment. Which *Libavius* himself confesseth when he grants, that we perceive a greater heat in hard Coals then in spungy, if we touch them. Now that is false, that the fire receives nourishment from the Air, since whatsoever is lighted must be in the inflamed body. But if fire be allaied with much Air, as happens in the burning of stubble and such like things, the fire is not thereby made stronger but weaker. And *Libavius* confounds the encrease of the fiery parts and the stronger action of the fire depending thereupon, with the intension of the heat it self. That one fire is greater then another is out of question; and manifest also it is, that in a greater Quantity the power of acting is greater, in a less quantity lesser. For that metal which is melted by a large flame of Wood or Coals, will not be melted by the flame of a Candle. But here lies the Question, whether the heat and fire which is in a great flame, be of it self more intense then that in a smal one. Which *Scaliger* denies, for the causes aforesaid, and maintaines, that those parts of fire, which they call degrees, are augmented by conjunction of parts, and not by intension of Virtue. Which opinion of *Scaliger*, though *Libavius* call's it a Nicety; Yet, He must needs allow of it, when he writes that the heat of Fire is as great as may be, in the smalest spark, and of it self suffers nothing to be taken from it, nor admits any part of a cold body into its society. And though he addes that the receptive subject of them both is altered; yet will not *Scaliger* deny this neither. For by how much the more Fire there is in any body, so much the hotter is it; and by how much the lesser, so much the less hot. Take for an example (which *Libavius* himself uses) seething Water. There is in boyling hot Water much Fire, whereupon if you pour cold water, it becomes luke-warm, because of the admixture of cold water, which hath no Fire in it. In a smal piece of Iron there may be more Fire, then in a great deal of stubble.

The Authors opinion.

I retain therefore the opinion of *Scaliger*, and hold, that one Fire is not hotter then another; but that Fire burns more strongly then Fire, comes by reason of the union of many parts; and that fire burns weakly, proceeds from the distance of the said parts. Which that we may understand more clearly, we must know, that Fire is most of all allayed by Air, which easily insinuates it self into the society thereof. Whence it follows, that in rare and porous Bodies, which containe much Air in them, Fire is more weak and dilute, and its parts are not too near. Contrariwise, In solid bodies, into which Fire pierceth where there is little Air, the parts of the Fire do stick more one to another, and are compacted.

Fire burns of it self and not by accident, as Scaliger imagines.

Howbeit from the premises it follows, that fire burns of it self, not by accident as *Scaliger* would have it; contrariwise that it does not burn by accident at al. For, seeing Fire of it self is the hottest of all bodies (though we have no such Fire with us, that is pure) and in pure Fire there is a great cleaving together of the parts there-

of,

of, it must also of necessity burn: which also it does in Iron, and other red-hot metals, because the Atomes or indivisible particles of the fire do Cohere together, and are extreamly near one another, and very many are contained in a smal place, and because of their conjunction they act more effectually. Contrariwise in stubble, and other spungy Bodies, because Air is mixed with the flame; and as *Scaliger* in his 9 *Exercitation* speaks, the fire is allayed by the Air, the parts of the fire do not stick together, but are at distance, the Air coming between, therefore they cannot act so strongly. For Fire truly is the first subject of heat, and the hottest thing of all others: but that it does not allwaies Act to extremity, comes by admixture of other Bodies not so hot, especially of the Air.

What place the Air holds. *Its three Regions.*

The next Element to fire is the Air. For it, as it declines from the rarity and heat of the Fir; so it takes up a room a little more remote from Heaven, and is heavy respectively. The Air is divided into three Regions: the uppermost, the middlemost, and the lowermost. The *uppermost* is above the Tops of the highest mountaines. For imagine but a surface upon the tops of the Highest mountaines, that shall make the Earth exactly round, the Air above the same, to the Sphere of fire is the uppermost Region. The other are below this, which are not allwaies of a like bigness. For in Summer the lowest is greatest, which reaches as far as the reflection of the Sun beams goes; and in Winter the middle Region. For in summer time when the Sun beams fal to righter Angles, they are reflected higher; but in Winter, the Beams of the Sun being very oblique, are reflected sidewaies, nor do they rebound aloft. The middle Region, in respect of the two others is least hot, and therefore it is said to be cold, because the Sun beams are not reflected so far: the other two are hotter; the uppermost, because of the Vicinity of the Heaven and the fiery Element; the lowest because of the doubled Sun beams, direct and reflex.

Howbeit the lowest Region is variously disposed, somtimes 'tis hot, otherwhiles cold, somtimes moist, otherwhiles dry, somtimes clear, otherwhiles cloudy; and the Air being in this Region variously disposed, does diversly affect our Bodies. For while we breathe, we continually draw it in, and by it the spirits in our Bodies are repaired and cherished, and our heat which in the Body needs continual fanning, is thereby preserved.

The Water.

After the Air comes the *Water*, an heavy Element, yet somwhat lighter then the Earth. This Element is no where found pure, but is every where mixed with the Earth and ambient Air; of which the taste is an argument, seeing you can hardly finde any Water void of taste.

The Earth.

The lowest place is taken up by the Earth, which is of all Elements the most heavy, and most unfit for motion. It hath much matter, and is therefore thick and dark. The Earth is not found pure on the top thereof, but if it be any where pure, it is in the Centre, whither no contrary does pierce, that may corrupt it.

The Water and the Earth do not make a peculiar sphere.

The Water and Earth do not make a peculiar Sphere as the rest of the Elements, nor does the water compass the Earth on all sides, but the Earth receives the water within its Cavities; and in very many places, by a singular providence of God, the Earth stands bare, for the more commodious generation and nutrition of Animals and other mixt Bodies, and it lies open to receive the Raies of the Stars. For Beautifulness and Commodity overcame the force of necessity, in respect whereof, the water was to have covered the whole Earth. As *Scaliger* saies, in his 9. *Exercitation.*

Now, How great the Earth and Water is can hardly be determined. That the compass of the whole Globe made up of Earth and water is 18000. furlongs, or 5400 German miles, and the Diameter thereof about 1718. German miles, is a thing out of question: but 'tis hard to say whether there be more Earth or Water: Yet most likely it is, that there is more Earth then Water. For neither is the greater part of the surface of the Globe of the Earth covered with Water, as appears by the true description of the said Globe: nor indeed is the quantity of the Water greater then that of the Earth; seeing by the sounding Plummet we discern that there is Earth under the Sea; and the depth of the Sea compared with the diameter of the Earth, is a thing of smal moment. Of which see *Alexander Piccolhomineus* in his *Treatise of the Largness of the Land and Water.*

The water with the Earth makes one Globe.

And, that the Sea is not flat and even, but that it makes one Globe with the Earth, is proved, first by Eclipses of the Moon, in which the shadow of the Earth appears circular; and therefore argues the Body of the Earth to be so likewise; and in the next place by Navigations: For if a man sail out into the main Sea, and take notice of some House or turret on the shore, at first he sees it all, afterwards scarce half, til at last he quite lose the sight of it, because the swelling roundness of the Water interposes it self between the shore and the mans Eye; for sight goes alwaies in a right Line. And although the Earth it self be not an exact Globe, but a Globous Body, high in some places, low in other some: yet this highness and flatness bears scarce any proportion to the whole Body of the Earth; which appears by Eclipses of the Moon, wherein the shadow of the Earth appears Circular, and makes a Circular Line.

THE THIRD BOOK.

Chap. 1. *Of the Elements as they are the Principles of mixt Bodies.*

The definition of the Elements.

Since in the Sublunary part of the World there is a perpetual Interchange of the generation and corruption of things, there must needs be some immediate Principles, of which variously mixed and tempered together, all things are generated. These Principles are vulgarly cal'd Elements, and by *Aristotle* 3. *de Cœlo, C.* 3. *T.* 30. thus defined. *The Elements of Bodies are those things into which the Bodies are resolved wherein they are actually or potentially, but they themselves cannot be divided into other distinct sorts of things.* And by *Avicen* they are defined to the same intent and purpose: *That they are simple Bodies, and the first parts of the Body of man and other things; which cannot be divided into Bodies of different forms, of the mixture of which, the several sorts of things generated are made.* Where you are to observe, that the chief Character of an Element, as it is the principle of a mixt Body, is indivisibility, in respect of any parts of several sorts, into which it can be divided. And therefore *Galen* also, when in 1. *de Elem. Cap.* 1. He had defined an Element to be the smallest part of that whereof it is an Element, himself adds; but that which appears smallest to the sense, is not indeed alwaies the smallest in reality. For many things by their smalness cannot be discerned by the senses.

Seeing these Elements were to be the Principles of a tangible and generable body, it was necessary that they should have also certain Qualities, by which they might be known to us, might work one upon another, and might be fit to effect all kind of mixture: which what and how many they are, let us consider in the first place. For they being known, we shal easily afterwards know, both how many Elements there are, and what their Nature is. These qualities are commonly called the first Qualities, not because they are absolutely first, or first in dignity, or because all other Qualities arise from them, but because they are originally in the first sublunary bodies.

The first Qualities, why so called.

Their Conditions.

Now these are their Conditions: that they constitute the first sensible, that is to say, tangible bodies, and be their differences as they are such: that they effect the first sense, *viz.* the touch: that they be in all bodies subject to Generation and Corruption: that they be contrary, and apt to do and suffer; for they are to be the Authors

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of Generation and Corruption: that they have none before them, whence they are termed first: that they cannot be made one of another.

How many first Qualities there are?

Moreover, that we may search out how many such Qualities there are, we must take a view of al tangible Qualities. *Aristotle*, in his *de 2. Generat. & Corrupt. c. 2. t. 8.* reckons up these first tangible Contrarieties; Hot, Cold; Dry, Moist; Heavy, Light; Hard, Soft; Clammy, Crisp; Rough, Smooth; Thick, Thin. Howbeit, among these seven Oppositions of tangible Qualities; only the two first deserve the name of first Qualities. For Heavy and light do not act one upon another. And the same may be said of the other four pair of Oppositions. For neither do they act or suffer one upon and from another; nor are they first Qualities, but arise from others, and belong rather to compound than to simple Bodies. And therefore there are only four first Qualities: Heat, Cold, Driness, Moisture. For in them al the abovesaid marks of first Qualities are to be found.

The definition of Heat.

These Qualities are defined by *Aristole* in the *2. de Gen. & Corrup. ch. 2. t. 8. and 9.* thus: *Heat is that which collects things homogeneal or of like nature.* For in that it separates things heterogeneal comes by accident. For to collect and gather together things of like nature, is to separate things of unlike nature Now by things *homogeneal*, or *of like nature*, we must understand, not only such things as are of the same sort, *but which have like temper, and may be changed into one nature*: by things heterogeneal or of unlike nature, not only such things as are of a different species or sort, but also *such as are of a diverse temperament, nor can be reduced into one nature.* For Heat alwaies endeavors to reduce things different into one Nature: which since it cannot do, by reason of the difference of temperaments, it only unites such things as it hath made alike, and rejects the rest as Excrements. These operations of Heat are every where to be seen, and especially in the Concoctions made in animals. For the soul makes greatest use of heat as its fittest Instrument to perform its actions by. For sundry meats being cast into the stomach, the Heat of the stomach reduces such as are fitting into one nature, and turns them into one mass of chyle; the other parts which are unfit, it separates as Dregs and Excrements, to be cast out by the Guts. The same does the Liver; the same do all the members. Also by the help of Heat all chymical operations are performed. For that Art by Heat separates metals; severs the parts of Plants and other things, and does other wonderful works. *Heat* therefore *is of all Qualities the most excellent; the first Instrument of Generation, and most efficacious in its operations.*

Cold defined.

Cold is a Quality that gathers together, both things of like, and things of unlike Nature. For we see how in Ice, by force of cold, several things, as Wood, Straw, Stones, Earth are congealed together; and the like cold does in other things and places; and it combines things together without any separation of what is heterogeneal. Here we must reject the Opinion of *Cardan*, who would have cold to be only a defect and privation of Heat. For Cold is doubtless a positive Quality; seeing it is perceived by the Sense, and hath certain powers whereby it acts and opposes Heat; which cannot be in a bare privation. Of which see *Scaliger in his 18. Exercitation.*

The Definition of Moisture and Driness.

That is moist, which is hardly contained in its own limits or bounds, easily in those of another thing. That is dry, which is easily contained in its own bounds, and does not easily receive the bounds of another thing. For we find by Experience, that the Air does of it self flow every where al about, and easily accommodate it self to the sides of the thing contained; and the like does Water: but the Earth flows not about, but retains and keeps within its own bounds: nor does it easily accommodate it self to all the parts of the body which contains it. By Moisture therefore things are made to cleave one to another; and therefore we see things overdried do break: and from driness things have stability and Consistency.

Now touching these definitions, this is to be observed: that *Aristotle* did not define the first Qualities absolutely considered, as they are in the Elements, considered as simple bodies and not compounded into mixt things; but as they appertain unto them, when they go into a mixt body. *Aristotle* was not indeed ignorant, that the first Qualities had other effects preceding those by which he defined them; and that an Hot thing Heats, a Cold, Cools; a Moist moistens, and a Dry Dries; yet he thought not fit to constitute or make up the definitions of the first Qualities by these effects; both because these definitions would reveal nothing that was hid-

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den, but the same thing would be defined by the same; and also because the first qualities are given to the Elements by Nature, for no other occasion but that by them as the immediate instruments they might be the principles of mixt bodies. And the first operations of the first qualities are originally more principal than the second operations of the said Qualities: but in the intent of nature contriving the generation of a mixt body, they are not the principal, but the second are more principal than they. Wherefore, omitting those common operations known of themselves, which they perform both in mixt and simple bodies, *Aristotle* would define them by those alone which they exercise in mixt bodies.

Whether the first Qualities are rightly divided into active and passive

These Qualities are divided into *Active* Heat and Cold; and *Passive* Moisture and Drineſs, of which division, although the opinions of Authors are various, as may be seen in *Archangelus Mercenarius, p.* 239. *Zabarella de Qual. Elem. c.* 5. *Franc. Piccol. de Qual. p.* 1. *cap* 8. yet I conceive, this ought to be our judgment. All these qualities, in respect of that univocal action, whereby each one by its first operations begets its like, and destroies its contrary, as wel in simples as in mixt bodies, do both act and suffer: yet in respect of their equivocal action, which they only exercise in mixt bodies, and whereby they produce the second qualities, and the nature of the mixt body it self, different from the nature of the Elements; two are termed active, and two passive. And in this respect, Moisture and Drineſs have no active power, but are only as matter which the Work-masters Heat and Cold exercise their craft upon.

Seeing these Qualities are in the Elements as in their first subjects, we may rightly by them search out also the number of the Elements. And omitting that reason which was produced in the second Book foregoing, we shall thus proceed. If the Elements be alterable, they must needs be more than one: but they are alterable, for they must be the principles of alterable bodies, and bodies that are corruptible. Therefore there cannot be one Element but many, and they endowed with contrary qualities, by which they act and suffer mutually. This reason agrees with that of *Hippocrates, Lib.* 7. *de Nat. Hom. t.* 5. where he saies: if a Man consisted only of one Element, he should never be pained: for there would be nothing to pain him, because he should be one thing; and, as *Galen* saies in his Comment, there would be no second to act upon him. For the self same body cannot suffer from it self.

The number of the Elements.

Now how many Elements there are, *Aristotle* demonstrates *in his* 2. *de Gener. & Corrup. cap.* 3. *t.* 16. and *cap.* 5. *t.* 34. after this manner. The Elements are therefore called the principles of mixt bodies, because being altered and changed one by another, they constitute the said bodies. Now all alteration and mutation depends upon the action and passion of the first Qualities, which are four as was said before. Those simple bodies therefore which are the subject of the first Qualities, shal be the principles of mixt bodies. And that they may rightly cause mistion, 'tis necessary, that each may suffer from each, and that therefore it have not only one, but two first Qualities.

Whether the first Qualities be the forms of the Elements.

From the Premises therefore, thus we conclude. There are so many Elements, as there are possible combinations of the first Qualities: but they are only four; Heat and Drineſs; Cold and Moisture; Heat and moisture, Cold and Drineſs: for the other two are altogether impossible, nor can extream Heat combine with extream Cold, nor extream Drineſs with extream Moisture: seeing contraries cannot be in one and the same subject. So many Elements therefore there are; The Fire hot and dry; the Air, hot and moist; The Water, cold and moist; and the Earth, cold and dry.

Hereunto may also be added another reason, which *Aristotle* uses in his 2. *de Generat. and Corrupt. Cap.* 8. *T.* 40. So many Elements there are, as there are things of which perfectly mixt Bodies do consist. But they consist only of four: and therefore there are four Elements. For we see all perfectly mixt Bodies to have much Earth in them, and to be moved towards the Earth: but mixt Bodies are moved according to the motion of the prevalent Element. And mixt Bodies because they are knit together and Co-here, and receive terms, there is also water in them, for it is the part of Water to unite and fasten: if Water and Earth, then the contrary Elements Fire and Air, by which they are to be allaied, and wherewith to be mingled. For mixture is not made without mutual action and passion. Moreover

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all Generation is made by Heat. And therefore besides water and Earth, heat also is required to mixture: but one hot Element doth not suffice: For it would be vanquished by two cold ones. And therefore, besides Water and Earth, Fire also and Air do concur to constitute all mixt Bodies.

Whether the first qualities be the forms of the Elements.

The number of the Elements being found out, we must now enquire into their Essence and Nature. And since the first qualities are very intimate to the Elements, the question is; *Whether the first Qualities are the substantial forms of the Elements?* Or whether the Elements have other forms besides the Qualities. Not to be prolix in a plain case, briefly thus we hold; that the first qualities are not the substantial forms of the Elements, but accidents. A token whereof is, that the first qualities are perceived by the sense; whereas no substance can of it self be perceived by the sense; again they are found in other things as mutable accidents; and therefore in the Elements themselves they cannot any waies be substances. Howbeit the hidden Forms of the Elements are by them Circumscribed by Authors. And therefore *Hippocrates* himself, oft calls the four Elements by the Names of Hot, Cold, Moist and Dry, as *Galen* witnesses in his 1. *De Temp. Ch.* 8.

The qualities proceed from the Forms.

By the Qualities therefore the Elements are known to us. For they are in the Elements as their Proper subjects, from whose forms also they depend and have their being. For I hold not with those who deny, that the first Qualities which are in the Elements do proceed from the forms of the said Elements, by way of Emanation, but derive them all from the motion of Heaven, or the Negation thereof. For 'tis an absurd thing, that a Natural Quality should proceed from any thing but its own Form. Nor must we think that the forms of the Elements are Lazy and Heartless, and produce no Qualities, nor work no operations. For if the first proceed not from the forms, which are most intimate with the Elements; I do not see what other Qualities can proceed from them: moreover an absurd thing it is, to hold that cold comes only from the Privation of the motion of Heaven: for since it is a positive Quality, it requires also a positive Cause.

Each Element hath two qualities.

But *in each Element there are two Qualities.* For seeing it is necessary, That every Element, for the more commodious generation of things and their mixtion, should be able to act upon every one, and suffer from every one: therefore each have two qualities. Now the Question in this place is; whether both Qualities do equally agree to each Element? *Or whether one Element have affinity to one Quality more then another, and have one Quality primarily, the other secondarily*: Moreover; *Whether in each Element both the Qualities are in the highest degree,* Or one only in the highest degree, and the other remiss: and it is disputed, how that place in *Aristotle* 2. *de Gener. and Corrup. Cap.* 3. *T.* 23. is to be understood; where *Aristotle* thus saies: *The Earth is dry more then cold, the Water cold more then moist, the Air moist more then hot, the fire hot more then dry.*

Whether each Element hath one quality in the highest degree?

'Twere long to recount the different opinions of Authors touching this Question, and to make any certain determination is hard: yet I shall briefly propound what I conceive most probable. Now we hold, that that one quality is most intimate to the Nature of each Element and more of alliance thereto then the other: also that one is more excellent, the other less excellent, *viz.* That the fire, as *Aristotle* hath it in the place forealleadged, is most Hot and Dry; the Air most moist and hot: the Water most cold and moist; the Earth most Dry and Cold; which also sense does testifie: and that these Qualities do after this manner flow from the form of each Element. And they are in an Error, who while they are sollicitous about attributing to each Element its own Qualities, do not so much regard the forms of the Elements, as their greater or lesser distance from Heaven, and think thence to fetch the qualities. Nor is that of any great moment, which hath moved many to think the contrary: *viz.* That the abatement of the quality is caused by its contrary; whereas the Elements are most simple, and have no contrariety in them. For this is true only of mixt bodies, but not of simple Elements: and that constitution of Qualities doth proceed from the form of each one. For as this is the Nature of the Air, that without the mixture of any heavy Body it is not so light as the fire; so it is a property thereof, not to be so hot as fire.

And

Whether the Qualities wherein the Elements partake, are of several sorts.

And here is also another Question, whether *symbolical Qualities*, for example sake the Heat in the Fire and the Heat in the Air, are of the same sort. Now the Answer is, That these Qualities are not of several sorts, and that we are not to acknowledg eight, but only four first Qualities, which in the first place our Sense it self doth witness, which judgeth all heat to be of one sort: and again when the symbolical Elements are changed, the Quality wherein they partake abides: and the watry coldness it self is as contrary to the heat of the Air, as to the heat of the Fire.

From what has been said may easily be collected, what is the nature of each Element. For the *Fire* is an *Element exceedingly and primarily hot*, and *Dry*. Both which experience does witness, wherby we are all dayly instructed that Fire is dry. For Fire can change both Air and Water. And therfore it must have Qualities contrary to them. For transmutation happens betwixt contraries; and whereas both the Air and Water are moist, the Fire contrariwise is dry.

We must therefore reject the Paradoxical opinion of *Johannes Baptista Montanus*, who teaches that the Fire and all Elements have some moisture in them, and that whatever is continued in Nature and united, whether it be simple or compound, is continued only by humidity, and that not only in this sublunary world, but in the Heaven also. For in mixture only it is, that divers simple bodies are coupled by moisture: not simple bodies, for so they should not be simple. But the form of every simple body, as it gives the being and bounds, so it couples and contains the parts.

The Fire compared to a King.

The Fire therefore, seeing it is Primarily and principally hot, al hot operations are therefore therein more conspicuous: and therfore it is neatly by *Scaliger* compared to a just King, which renders every one his due, dividing the Land amongst families: and to a prudent steward of an house that reserves to himself as much as he needs. For out of Wood, it gives ashes to the Earth, liquor to the water, vapor to the Air; and takes that to it self which is concealed from the Eies of the Vulgar, but not from the mind of the Wise. And although very many in this age seek to banish Fire out of the Universe: yet I conceive we ought not to reject the same, as hath been said before in *B. 2. ch. 3.*

Air is most moist and hot.

The Air is hot.

The Air in the highest degree and primarily moist. Now touching the heat thereof, there is great difference amongst Authors. For the Stoicks as *Seneca, Nat. Quest. Book 2. Ch. 10*, Cardan *Lib. 2. de Elem.* and others do hold against the Peripateticks that the Air is cold. But I must take part with the Peripateticks for the heat of the Air; seeing there are strong reasons to back that opinion. For Air is produced and preserved by that which is hot: but is condensed by cold, and turned into water. Moreover the lightness of the Air is a token of its Heat, seeing Lightness follows after or accompanies Heat. Moreover, if the Air were cold, there would be no simple body hot and moist, and water should agree with Air, and therefore one of the two would be superfluous. More reasons are to be found in Authors to this purpose. But all which is said of Air in this case must be understood of it, as it is a pure Element. For being mingled with vapors, and affected with a strange quality, it hath oft-times a faculty of cooling, and oft-times of drying, which nevertheless agrees not thereto of it self, but by accident.

Water is an Element most cold, and moist. Earth an Element most dry and cold.

Water is an Element in the highest degree and primarily cold, and moist: the Earth in the highest degree and primarily dry, also cold. Concerning these two Elements few Controversies are started. For whereas some dispute, whether the Earth or the water is primarily cold, the question may easily be determined, from what hath been said. For they which would have the Earth colder than the Water build upon a bad foundation: *viz.* that all the Elementary Qualities proceed from Heaven, which was before rejected. *And so much for the Elements.*

Chap.

Chap. 2. *Of the Action, Passion and Mixture of the Elements.*

After we have explained the Nature of Elements, the next thing is, that we declare, how mixt bodies are of them compounded. Now forasmuch as the Elements, unless they be altered, cannot constitute mixt bodies; nor can they be altered unless they act and suffer one from another; nor can they act and suffer, unless they touch one another, as *Aristotle* hath it, *de Generat. & Corrupt. Lib.* 1. *cap.* 6. *t.* 43. we must first speak a little concerning Contact or mutual touching, Action, passion and Reaction.

Contact is chiefly twofold: one improperly so called, which they term virtual; whereby things incorporeal do act upon other things, or a distant body, doth by its Virtue work upon another remote body. The other is a Contact of magnitudes; of which there are again many fashions. For absolutely and generally al things are said to touch, which having distinct magnitude and position have their extream parts close one to another. And then there is a Physical or Natural Contact, of which we are now treating; and this belongs to bodies having divers magnitudes, whose extream parts are together: and which act and suffer one upon and from another. Or in a word: Those bodies touch with a Physical contact, whose bounds are together, and which mutually act and suffer one upon and from another. For besides these things which are common to all bodies that are said to touch one another, *viz.* to have magnitudes distinct, a certain position of parts, their place and extream parts together; this is peculiar to Physical contact, that bodies which do thereby touch one another, do act upon and suffer from one another. Thirdly, Those bodies do touch one another, whose extream parts are together, and one only acts upon another, but suffers nothing therefrom.

Contact is therefore required as a necessary condition in sublunary things. For it hath been before proved in general, that every Agent must be together with the Patient. For since by the Agents action upon the Patient, some mutation ought to be made, of necessity that must be present which changes, or at least its Virtue; and its Virtue cannot be present, unless that be present which carries it. And therefore in every action the Patient is toucht by the Agent, or at least by that which carries its Virtue. For nothing acts upon the extream, but it acts first upon the medium.

Yet we must here diligently observe; that there is a double action, the one primary, which immediately follows the nature of the thing; the other secondary proceeding from the primary. The primary action of the Sun is Illumination: the secondary Heating. The primary action of the Fire is to heat; the secondary to melt, to harden. Now touching the primary 'tis only true, that the Agent acts not upon the extream, before it act upon the Intermedium. For the second Action, besides *that* that it presupposes the first, also it requires an aptitude of the subject to suffer; whence that vulgar assertion in the Philosophck Schools, The actions of Active things, are received in a Patient and that which is disposed also, Whatever is received is received according to the disposition of the Receiver. So by the Sun light is produced, both in the Æthereal and Elementary world; but the Heat not in Heaven, but only in sublunary things. So Fire heats both Wax and Clay; yet it melts the former and hardens the latter: because the former is indisposed to be hard, and the latter is indisposed to melt.

With the Mutual contact of the Elements is conjoyned their Action and passion. Now by action we do not here understand every action, but that only which is betwixt the first qualities, Now among what things there might be Action, the Ancients were not agreed, as may be seen in *Aristotle, de Generat. & Corrupt. Lib.* 1. *Cap.* 7. *T.* 46, 47. For some held, that all action and passion was betwixt things unlike; others, that a thing did not suffer from a thing unlike, but only from its like. We with *Aristotle, in the place aforesaid, Text* 50. do hold the middle opinion, and do say: that every agent endeavours to make the patient like it self, and that therefore a thing like as it is like, and according to the same quality whereby it is like, does not act upon its like: for examples sake, that which is cold, as it is cold, does

not act upon a cold thing: nor does that which is diverse, act upon that which is altogether diverse; for Heat does not act upon heat: but contrary acts upon its contrary. And therefore those things which act one upon another, and suffer one from another, are partly like and partly unlike; like in Kind, but unlike in sort; for contraries are under the same kind, but differ in the sort.

Howbeit, What hath been said, that like does not act upon its like, must be a little more diligently weighed: because from the right understanding of this Axiom, we come to the knowledg of many things in Natural Philosophy and Physick. In the first place it must be observed, that in this place, we speak of that similitude which is betwixt the first qualities; and in the next place that this similitude is three-fold. For some things are alike, only according to the sort of quality; although in the degree, or the intention of the quality and vehemency of the action, which they cal activity, they are unlike. So every hot thing is said to be like another hot thing, and fire is said to be like lukewarm Water, and other things any waies hot. Other things are alike, both in the sort and the degree of the quality, although they differ in the vehemency of their action: thus the fire in a red hot Iron, is like that in burning wood. Other things are a like, both according to the sort of the quality, and according to the degree thereof, and according to the power of acting. So two fires, which are in matters of the same bigness, and of the same rarity or density are alike. For this must not be forgotten; that equal activity does not alwaies proceed from the same degree of quality; nor hath every heat which is alike in degree and intension, an equal faculty of heating, but oftentimes where there is no excess of degree, there is yet an excess of operation, either by reason of the plenty of matter, or the density thereof. For the fire which is made of a great Faggot, is not hotter or more intense then that which is made of a stick or two; but only hath a greater activity; and a dram of Pepper is not according to the degree of heat more intense, then one Pepper Corn: but only hath a greater power to act. For in a greater magnitude there is more virtue: and in much matter, much form. So the fire in a red hot Iron, is not hotter then that in stubble: but it hath a greater strength to act. For force united is more strong then that which is dispersed: and an agent the nearer it is to the Patient, the more it acts thereupon. Now the parts of a compact body are less distant from any particular point in the patient, then the parts of the same Body rarified, and extended to a greater bulk. Moreover, in a dense Body, there is more matter, and therefore more form; and by compactness of parts, there is more substance in a less space, and therefore greater force. For parts condensed are like many individuals joyned together, which act more powerfully then one. And therefore wherever there are more degrees of the same quality, whether they be collected by intension, or the magnitude of the subject, or the condensation thereof, there is the greater Action.

What kind of action there is betwixt like things.

These things thus premised, we shall deliver our opinion concerning the action of things like, in these propositions. I. *Things like may act one upon another after the first manner, so that the more intense will intend the more remiss; and that which is remiss will abate that which is intense.* According to the common Axiome of Physitians, which is a principle of the Art of compounding of Medicaments. For seeing action is betwixt contraries, not only the extreams do mutually act one upon another, but also the Mediums and the extreams. For even by the Medium, as a contrary, muration is made. For as *Aristotle* hath it in his 5. *Phys. Cap.* 1. T. 6. *A Medium is in some sort an extream.* And that which is remiss, is in place of the other contrary. And *Aristotle* himself explains what he understands by contraries, in 1. *de Gener. & Corrup. Ch.* 7. T. 51. *Now because the Agent and the patient are the same and like in kind, but unlike in sort; and such things are contraries: it is manifest, that actives and passives are one contrary to another, and also Mediums.* Also experience proves the same thing, which teaches us, that a hotter thing added to a less hot, makes it more hot, and contrariwise; and that lukewarm Water put into that which is boyling hot, does allay the heat thereof; and continually from the mixture of that which is intense with that which is remiss there results a compound, more intense then the remiss parts and more remiss then the intense.

II. *Among things like, according to the second way, there is no action.* For seeing according to the sort and degree, and the first act, wherein the Nature of qualities consists, and to which mutation tends, these qualities are like, and are not of different sorts; and therefore are not contraries: therefore there can be no action betwixt

twixt them. For every action is betwixt contraries, and every agent by acting endeavours to make the Patient like it self, and to give it the same Nature and Act. Moreover, since action supposeth essence, no thing which is in aptitude to be this or that, can be made actually so, but by that which is actually such. And therefore a thing hot to four degrees, though it may be intended to more degrees; yet it cannot be by any thing intended, save by that which hath above four degrees of heat in it. Also experience justifies our assertion. For suppose for examples sake, that there are two Bodies in the highest degree hot, the one greater and more compact, the other less and more spungy; the former indeed acts more vehemently, Yet can it not work upon the latter, because it hath already attained the highest degree of heat.

III. *Also between things alike after the third manner, there is no action.* For seeing it is rightly said by *Aristotle*, in is 1. *de Gener. & Corrup. Cap.* 7. T. 31. That *the Agent doth make the Patient like it self*: Betwixt things perfectly like, there can be no action. And from the premises it appears, betwixt what things there can be action and passion; which *Aristotle* hath briefly comprehended, in the foresaid place, where he saies: *It is manifest both that contraries, and those things also which are Mediums, do mutually act and suffer, one upon and from another.*

Whether there be Reaction among the Elements.

But here arises another Controversie from that which hath been said, *viz.* That al things of the same kind, do mutually act and suffer one upon and from another; for it is hereupon disputed; *Whether amongst the Elements there be a reciprocal Action and passion*, Which they commonly term *Reaction*: or whether an agent, working by the first sensible qualities of it self, being close to the Patient and contrary thereunto, do suffer any thing likewise from the Patient. Now action is here by way of eminency ascribed to the stronger, and passion to the weaker; and that action by which the Patient acts back again upon the stronger and more potent, is termed Reaction; and the passion whereby the agent being stronger receives the action of the weaker, may be termed Re-passion.

And besides other things, which make a difficulty in this Case, which may be read in *Tolet, L.* 1. *de Gen. & Corrupt. Ch.* 7. *Q.* 15. Zabarella *de Reactione C.* 2. *Franc. Piccolhomineus L. de Effect. & perpes. operant. per Nat. C.* 20. Victor Trincavellus *in Quest. de Reactione.* That passage of *Aristotle*, in his *B. de Animal. Mot. C.* 3. *Whatever things are of equal strength, they do not mutually act one upon another, but are overcome by exsuperancy*, hath brought many into an Error: some so as quite to deny all Reaction; and others who saw it demonstrated by reason and experience, that there was Reaction, so as to make them feigne false manners of Reaction. For some hold, that there is indeed Reaction, but that either it is not according to the same part, or not according to the same Contrariety. For if there be a certaine hot thing, which hath not an equal degree of heat in all its parts, they say it may act according to its strong parts, and resuffer according to its weak ones: but if all parts have equal Heat, then it cannot suffer any thing from the cold patient, according to the same contrariety, but according to some other: as if the fire act upon Water, it suffers nothing therefrom as it is cold, yet it may suffer therefrom as it is moist. Others do thus think: that Reaction is primarily indeed, and of it self, according to a diverse contrariety, but secondarily and by accident, according to the same Contrariety. Forasmuch as one quality may be corrupted primarily by its contrary quality, and accidentally by the Corruption of that, wherewith it is Naturally in the subject: as for examples sake, the Heat of Fire while it acts upon Water as cold, of it self or primarily it resuffers not from the coldness of the Water; yet because the conjoyned driness suffers from the moisture of the Water, it is also therewith debilitated and remitted.

You may read more opinions in the Authors forementioned, all which rejecting, thus we determine: that there is a Reaction; and that it is according to the same contrariety, and the same part, and of it self and primarily, And the first is taught, in the first Place, by experience. For if a Man take a piece of Ice in his Hand, both his Hand is cooled, and the Ice is melted; and a red hot Iron cast into cold Water, it heats the Water, and is cooled by the Water, And Reason proves the same. For reaction being taken away, there will be no Mixture: seeing mixture cannot be made, unless the qualities of the Elements being by mutual action and passion broken and remitted and altered, be reduced to a certain temper and Con-

cord. *Ariſtotle* ſaies the ſame, in 3. *Phyſ. Cap.* 2. *Text* 8. 16. 1 *de Gen. & Corrup. Cap.* 7. *T.* 53. *C.* 10. *T.* 87. 89. *Lib.* 4. *de Generib. Animal. Ch.* 3.

The ſame Experience teaches the other, which witneſſes that boyling Water and Cold, which are only oppoſite in heat and cold, if they be mixed together, become tempered, and that the boyling heat allaies the coldneſs of the cold Water, and the cold abateth the Heat of the boyling hot Water. For unleſs Reaction were according to the ſame contrariety, there could no mixture be made. For if the Fire as hot ſhould only act, and ſhould not ſuffer; the heat and moiſture of the Water would remain in the higheſt degree, and conſequently no mixture would be made. Moreover, every contrary, Naturally and of it ſelf, acts upon its contrary, as long as it is in preſence. Hither tends that, *Out of the* 3. *de Gener. Anim. That which beates is cooled by that which is heated.*

The ſame Experience makes for the Third, and Reaſon teaches, that if there muſt be perfect mixture, all parts of the Elements muſt be altered, and reduced to a Mediocrity.

Experience alſo confirms the fourth, whereby we are taught, that hot and cold Water, which agree in moiſture, and are oppoſite only in heat and cold, can nevertheleſs mutually act and ſuffer. And truly, heat is not peculiarly joyned with moiſture or drineſs, but may conſiſt with either: whence it is alſo that the Elements which have affinity one to another in one of their qualities, do mutually act and ſuffer.

And that we may free our ſelves from that difficulty which hath ſeduced others, we are to know: that there is a twofold action, one imperfect and begun, which they cal an action without the Agents Victory, whereby the Agent does not change the whole Paſſive ſubject, but only weakens the ſame, and impreſſes ſome degree of a quality thereinto: the other perfect and compleat, which they cal an action with Victory of the Agent, whereby the Agent makes the Patient perfectly like it ſelf. Hence, we anſwer, 'tis one thing to act, another thing to overcome; one thing to ſuffer, another thing to be overcome. And therefore, if Action be taken in the firſt manner, for action begun, in every Alteration, there is Reaction, and the contrary Patient reacts upon the Agent; provided it be in fitting diſtance and quantity. For even that which hath leſs force, before it is quite overcome and aboliſhed, makes impreſſion of ſome quality upon the ſtronger, and extinguiſhes ſome degrees of the contrary quality. But if action be taken for a perfect abolition of the other quality, there is no Reaction. For nothing can perfectly deſtroy a thing, and be perfectly deſtoied thereby. Wherefore that ſaying of *Ariſtotle*, before alleadged in his *B. de Motu Animal. c.* 3. muſt be underſtood of this action, and not of the former.

The definition of Mixture.

And ſo much ſhall ſuffice to have ſpoken of the mutual action and paſſion of Elements: we now come to *Mixture* which reſults therefrom, which *Ariſtotle* in his 1 *De Gen. et corrup cap.* 10. Thus defines: *Mixture is the union of things apt to be mingled, being firſt altered.* Now things apt to be mingled, are ſuch as can ſubſiſt ſeparate, by themſelves, and they are only ſubſtances. Hence accidents are neither ſaid to be mingled one with another, nor with their ſubſtances; and miſtion is properly of bodies, not of qualities: again, ſuch things as are contrary, and can mutually act and ſuffer; finally ſuch as can give a bulk to the mixt Body.

whether or no and how the Elements remain in a mixt body?

But here ariſes no light Queſtion, *How Elements remain in mixt Bodies.* For ſeeing the things mingled ought to be altered, not corrupted; it ſeems the Elements remain in the mixt body, but periſh not. Contrarily, ſeeing mixture is not only an heaping or jumbling together of the things mixed, but an Union, ſo that of many Natures one is made; it ſhould ſeem that the Elements do periſh, and that of them a certain new Nature is made: whereabouts, the opinions of Authors are various. We, rejecting the reſt, will follow *Avicenna*, whoſe opinion is approved of very many moſt learned Phyſitians, and ſeems ſo evident and firm to *Fernelius*, that in the *Second Book of his Phyſiology, cha.* 6. he calls the contrary opinion vain and childiſh, Yea and monſtrous, and ſuch he accounts it, as that it ſtains al the Glory of that Philoſopher that holds it. Now the opinion of *Avicenna* is, that the Elements do not only remain in the *Mixt Bodies*, but alſo *retain their forms perfect and entire.* For in the firſt place, ſeeing *Ariſtotle* himſelf, *in the end of his Book*

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de Ortu & Interitu, defines mixture to be, *The union of the things mingled, being Altered*; The very Nature of mixture declares as much; Seeing things which are not preserved cannot be mingled. Nor does the word union oppose this opinion. For *Union is the coupling of things which truly are*, but not of things which are perished. And though of many things one is made; Yet neither is it necessary that those simples should perish, nor is it a bare heaping together, but by a superior form the simples are reduced into one Body. Moreover, since action supposes an act, and in mixt Bodies the Actions of the Elements appear, it must needs be that they are actually in them. Not to speak of others, *Aristotle* himself, *in the beginning of his* 1. *de Cœlo*, writes that a mixt Body is moved according to the motion of the most prevalent Element. Finally, the resolution of mixt Bodies into the Elements shews the same. For mixt bodies are resolved into the Elements, and *Aristotle* himself holds *in* 1. *de Gen. & Corrup. Text* 84. That the things mixed may be again separated from the mixt Body. Which if it may be, they must of necessity actually exist in the mixt Bodies.

Now their opinion is altogether foolish who hold, that the Elements do not return out of the mixt Body, the same in number, but the same in sort; nor is it founded upon any reason, but is only invented to palliate an absurd opinion; rather it is opposite both to reason and Experience. For whereas they hold, that the Elements return out of the mixt Body, by reason of the action of a like Element, whereby they recover that which they had lost in the Mixture; how I pray you in distillations and burnings, can Water and Earth be drawn out of the compound, seeing the fire by acting upon the mixt Body, introduces nothing Watry, nor any thing Earthy: Yea the action of the Fire is contrary to the Water and the Earth, but does not augment, nor perfect the same?

And that which *Averroes* and *Zabarella* do produce concerning the refraction of forms, is a meer figment, and that opinion is sufficiently refuted by the *Latins*, disputing against the opinion of *Averroes*, who hold the forms of the Elements are capable of more and less; nor have they ever brought so much as a probable reason for their opinion, but only simply affirm, that forms have certain degrees, some of which being taken away, the rest may remain.

Howbeit, not only the Concourse and action of the Elements is requisite, to produce a mixt body, but the direction of a superior form must of necessity by joyned. Which thing also *Scaliger* acknowledged, where in his *Exercitation*, 307. *Sect.* 20. he thus writes, *Unless the four Elements should have a Governour or Pilot, they would vainly and to no purpose toss and be tossed. For what is it that mingles so much Earth with the rest? But there must be in every thing, one thing primarily moved. Now they cannot move themselves to any work, but in Compounds, by a more excellent form, and in things imperfectly mixt, by an external principle, they are moved to a mutual connexion.*

Thus therefore we briefly express the whole Nature of mixture. In mixture the simples must first of all be divided into very smal parts; therefore things Liquid, brittle, fine, are easily mingled. The Elements being thus divided into smal portions according to the Nature of the mixt Body; they do by their contrary qualities mutually act one upon another, and suffer one from another; do heat, cool, moisten, dry one another mutually, and one acts upon another, as on a separated contrary: for they are not as yet united. But becaufe the force of heat and cold is greatest, therefore these things do first temper themselves, and the cold renders the heat temperate and moderate, as far as the Nature of the mixt Body to be produced requires. This tempered heat does afterwards extenuate the moist and dry as the matter, that the parts of the simples may be perfectly mixed, according as the Nature of the mixt Body requires. For heat alone of it self is the Author of mixture; but cold accidentally concurs to mixtion, inasmuch as it moderates the heat.

Chap. 3. *Of the Generation and Corruption of Bodies Natural.*

BUt, inaſmuch as a mixt Body and the Generation of a mixt body are either one and the ſame thing, or at leaſt the one cannot be without the other; we muſt now treat of the Generation of a mixt Body. But, foraſmuch as there are ſundry ſorts of generable and corruptible things, and ſome are ſimple, others mixt, we ſhal firſt ſpeak of generation in general, *viz.* As it concerns every ſubſtance liable to generation and corruption; afterwards, of the ſorts of generation, *viz.* The Tranſmutation of the Elements, the generation of mixt Bodies, and their corruption, which is putrefaction.

The Definition of Generation.

Now Generation as it is taken in General, *Ariſtotle* defines in his 1. *de Gen. & Cor. cap.* 4. *t.* 23. thus: *Generation is the mutation of the whol, no ſenſible thing remaining, as the ſame ſubject.* The Senſe of which definition is this; that Generation is a ſubſtantial mutation, wherein the ſpecifical form of a natural body being aboliſhed, a new one is produced, ſo that there remains not the ſame ſenſible ſubject of the form acquired, which was the ſubject of the form loſt, and the whol compound is ſaid to be corrupted, and a new one generated. For the whol, in the definition of Generation, dothnot ſignifie all the parts of a natural body; for the *prima materia*, or firſt matter is not corrupted: but the Integrity, Abſoluteneſs, and perfection of a natural body, conſiſting in its ſpecifick form; which is therefore by *Ariſtotle* ſomtimes called *Totum*, becauſe it compleats and perfects the whol Eſſence of a thing. For as the ſort of a number is taken away, when one unity is ſubſtracted, and the number of ſeven ceaſes to be ſeven, when one is taken from it, although the other ſix unities remain: ſo, by reaſon of the ultimate and ſpecifick form of a natural body, the whol is ſaid to be changed and to periſh; ſo we ſay, an Horſe is periſhed, though the form only be periſhed, the Body ſtil remaining.

Wherein the Nature of Generation and Corruption conſiſts.

Herein therefore conſiſts the whol Nature of Generation and Corruption, that the laſt and ſpecifick form be aboliſhed, and another ariſe, or be introduced, by which the compound generated may differ ſpecifically or as another ſort, from the former which was ſaid to periſh, when the form periſheth. Hence alſo it appears how that common ſpeech, That Generation and Corruption is not of the form, but the matter, is to be underſtood. For the meaning thereof is not, as if all the parts of a natural body were corrupted, or bred anew; for the matter remains the ſame in all generation and corruption: but that, by the mutation of the ultimate and ſpecifick form the compound it ſelf is changed, and receives a new denomination.

Now that this is the Senſe of theſe words, and what is to be underſtood by the mutation of the whole, theſe following words of the ſame definition declare: *No ſenſible thing remaining as the ſame ſubject.* By which words *Ariſtotle* intimates; that in no ſubſtantial Generation the ſame ſenſible ſubject can remain for both forms, *viz.* that which is loſt and that which is gained. For though the *materia prima* be preſerved: yet is it not ſenſible: which is true not only in the generation of Elements, and of mixt bodies, but even of the generation of Animals. For when a living Creature periſhes, the form which is loſt, is the Soul: but that which is the form of a dead Carcaſs, is an inanimate mixt body, or a congeries or heap of many forms, which conſtitute many and divers homogeneal mixt bodies; and ſo theſe two forms have not one common ſenſible ſubject. For that which was inſtead of a ſubject to the Soul, was the form of mixture: but the ſoul departing, thoſe forms of many homogeneal mixtures do no longer ſupply the place of a ſubject, but of ſpecifick forms, whoſe ſubject is the firſt matter. And although in the generation of a Carcaſs there comes no new form; yet it is all one, as if there came a new form. For the form of mixture in the living Creature, in reſpect of the whol live Creature, did hardly ſupply the place of a form, but rather of a Subject and Matter; ſince in every mixt thing, the Eſſential parts have the ſame reſpect one to another, that every precedent inferior, is to the following ſuperior, as Matter to Form, and aptitude to Act. But when the Soul is taken away, the form of mixture,

mixture supplies the place of the specifick form, and really performs the office of a form, and gives denomination and specifick being to the mixt body; which it did not do before, when the Soul was present.

whether in Generation, there is a Resolution into the first matter.

Out of the Premises an Answer may easily be made to that Question: *whether besides the first matter, any form which was before in the thing corrupted, do remain in the thing Generated; or whether in every Generation there is a Resolution into the* Materia prima *or first matter?* For seeing things perfectly mixed, are either parts of living bodies, or other sorts of bodies natural, as precious Stones and metals; and the generation of these things is performed, not only by the Concourse, and action of the Elements, but by the direction of the upper form: again, it doth not alwaies draw and mingle simple Elements, for the formation of a body necessary to it self, but also the first mixt bodies; therefore it is not necessary, that there should be alwaies a resolution into the first Matter.

The Form of Generation. *The Subject.* *The Efficient.*

Also from the Premises all the Causes of generation may be collected. The form is expressed in the definition, by substantial Mutation. The common subject of generation, is the first matter it self; and the immediate subject, are the four Elements of sublunary things. The general and remote Efficient, is the Virtue of the Heavens: the immediate and adequate, is the Generator or Agent, *viz.* the forms of sublunary things. For they by the first qualities and viral heat, as their immediate Instruments, do make mixt bodies for themselves, necessary for their own preservation, and the performance of their actions.

The End.

But the first matter is not the adequate cause of generation: seeing it is a being, meerly potential, and can beget or effect nothing, but only suffer. And therefore the matter is a cause that the Generation may be made; but the Agent or Generator, is the cause that it is actually made. The End of Generation, is the Conservation of the several sorts of Natural things. For since in the sublunary part of the world there is no perpetuity and eternity of individuals or particular things; Nature conserves the Eternity of every sort, by the perpetuity of Generation.

The definition of generation, agrees also to coruption, as manifestly appears out of the last words of *Text* 22. *c.* 4 *Lib.* 7. *de Gen. et Cor.* and appears from the thing it self. For the generation of one thing, is the corruption of another; as is wel said by *Aristotle* 1. *de Gener. & Cor. c.* 3. *T.* 17. For, since that which corrupted is not turned meerly into nothing, but the matter remains; and it cannot subsist of it self, without any form; it must be, that one compound being abolished, and one form destroied, another form should come, to constitute a new compound. Moreover, since two specifick forms cannot be in the same subject (for nothing can be at the same time under several sorts) it must needs be, that when one form comes, the other which was before in the subject, must give way. Hence also came that saying; That Nature primarily intends generation, secondarily corruption. For one thing cannot be generated, unless another be corrupted. For since the intention of the Generator, is to make the Patient like it self; and this it cannot do, unless it first destroy the form therof: secondarily therefore it desires the destruction of another. And this is the Cause of the perpetuity of Generations and Corruptions; *viz.* Because the matter when it is robbed of one form, receives another; and when it puts on one, it puts off another. Yet it must be here observed, that the Generation of one, is not the corruption of a body of the same sort, but of another of a different sort.

Nature primarily intends generation, secondarily corruption.

Having thus explained the universal Nature of Generation, let us now speak of the sorts of Generation. The Proportion of the Elements which act one upon another is various: For somtimes one contrary only prevails in strength over another, so as to be able quite to abolish the same, and to turn it into its own Nature; and then there happens the generation of one simple Element. Somtimes the Elements are after a sort equal, or at least their inequality is not so great, that one of them can quite destroy the other, and turn it into its own Nature; and then, by mutual action and passion they weaken one another, and making friends as it were, they grow together, into the Nature of one mixed Body. Now we shall speak in the first place, of the generation of Elements. And although, not only *Empedocles*, and other Ancient Philosophers, but also some late writers, deny that the Elements are turned one into another: yet we shall retain the common Doctrine, which is proved by reason and experience. For we see daily, that by fire other

Whether the Elements can be changed one into another.

Elements

Elements are turned into Fire; and water, which of its own Nature is moved downwards, when it is set over the fire, turns to Air and mounts of its own accord upwards, which motion belongs properly to Fire and Air. Now the Reason is this: those things are apt to be changed one into another, which are contraries, and have one common subject. And such are the Elements: for they have the first matter for their common subject, and contrary qualities. And therefore they may be changed one into another. Howbeit, the Elements are changed, not in whole, but in part.

And indeed all Elements are apt to be mutually changed, and there is none of them, which may not be changed into another: for as *Aristotle* saies in 2. *de Gen. et Cor. c.* 4. T. 24. *Generation is out of Contraries into Contraries, and all the Elements have a Contrariety one to another, because the differences are contrary.* Howbeit, these Elements which agree in one quality, as fire and Air in heat, water and Air in moisture, are more easily and speedily changed one into another: but those Elements which are quite contrary and disagree in both qualities, are more hardly changed one into another. For when two things joyned together are to be changed by their contraries, they resist more strongly, then when one quality only is contrary, and the other like; because by reason of that similitude, the approach of the contrary is more easie. And therefore of two contrary Elements, a Medium is sooner generated, then one of another: and we see that of Fire and Water, Air is bred. For the Medium agrees with both, in qualities.

Mixture and the generation of a mixt body, differ not really, but only in respect.

And so much of the Generation of Elements. Let us now come to the simple generation of mixt bodies. Now the *Generation of a mixt Body and Mixture*, of which we spake in the foregoing Chapter, are really one and the same thing: although they differ in respect. For both mixture, and the Generation of a mixt Body, doth signifie a certain progress to the form of a mixt Body, which consists first in mutual alteration, caused by the action and passion of the first qualities; also in the action of the two active qualities upon the two passive, or in the mixture of moist with dry; Finally and chiefly, in the production of the form it self: and therefore both the generation of a mixt body consists in Mixture, and Mixture is contained in the Generation of a mixt Body. For the term union, doth not only signifie a collection of the Elements, and a placing them together; but a production of one Nature, out of several things mingled.

Yet they *differ in respect.* For since both in mixture, and in the Generation of a mixt Body, the Elements are as it were the term *a Quo*, and the mixt Body, the term *ad Quem*; the term mixture, doth chiefly respect the Elements, for the mixture is of the Elements, and not of the mixt Body: but the term Generation respects the mixt Body it self. For *that* is then said to be generated, and not the Elements. Nor yet can the one be without the other; nor doth mixture in time or Nature precede Generation: both consist in the production of one Nature.

The definition of the generation of a mixt body.

Now *Aristotle* defines the Generation of a mixt Body, *in the* 4. *of his Meteors Ch.* 7. after this manner: *Generation is a simple mutation, by the active faculties, when they have their respect, from the matter subject to every nature.* Now, this is the sense of this definition: the Generation of a mixt Body, is a substantial mutation, made by the two active qualities, acting upon the two passive, as their subject matter, and ruling over them in such a proportion, as is necessary to draw forth the form proper to every mixt Body. For the active qualities are not alwaies in an equal proportion to the passive, but variously proportioned, according to the divers Natures of mixt Bodies, which require sundry temperaments. Nor is the dominion of the active qualities over the passive, so to be understood, as though in every mixt Body, the active qualities did in some degrees exceed the passive; since experience doth testifie the Contrary, which teaches, that some mixt things, are to be termed hot, some cold, some moist, some dry, according to the Nature of the over-ruling quality: but this dominion is only to be understood in respect of the form of the mixt Body, to be Generated. For then Namely, the active Qualities are said to rule over the passive, when the proportion of the former to the latter is such, that out of them they might produce some certain form of a mixt Body. For even that which is hot to four degrees, acts upon that which is moist to six, and thereof makes a certain mixt Body.

That

That Queſtion alſo muſt not be here omitted; *Whether in this Caſe the power of the two active Qualities be equal, and their office and Dominion equal.* Touching which we are to know, that both the Generation of the mixt body it ſelf, and the alteration previous to the form, do proceed of themſelves and primarily from heat, and that cold doth no other wiſe concur, then as it tempers and moderates the heat, and makes it fit to produce this or that mixt Body. For the Generation of a mixt Body does chiefly conſiſt in a perfect mixture of moiſt and dry, ſuitable to the Nature of the mixt Body: but this cannot be done, ſave by attenuation, which makes that all the particles of the moiſt matter may be exactly united with the particles of the dry; now extenuation of it ſelf is cauſed by heat, ſomtimes greater and ſomtimes leſs. But cold of it ſelf is not an inſtrument of generation, but rather of corruption. Howbeit, in a mixt body already generated, and conſtituted in its eſſence, even cold alſo acts of it ſelf, and confers thereon its perfection as it were, and aptitude to its operations. For mixt bodies are congealed and condenſed by cold.

Laſtly, after the Generation of a mixt Body, it remains that we now treat of the Natural deſtruction thereof, which is *Putrefaction:* concerning which, ſo great are the Controverſies amongſt learned Men, that ſome late Phyloſophers and Phyſitians have filled whole Books with diſputes about putrefaction. We, though much might be ſaid thereof, ſhall briefly diſcourſe thereupon, ſo much as the Nature of our work will bear. And ſeeing Putrefaction is oppoſed to the Generation of mixt bodies, we may eaſily proceed from the knowledg of Generation to the knowledg of putrefaction. It hath been already ſaid, that the whole Nature of mixture, or of the Generation of a mixt Body, doth conſiſt in a due conjunction of moiſt parts with dry, which is cauſed by heat, in a certain degree: and ſince the Cauſe of the Generation and conſervation of a mixt Body is the ſame; a mixt body ſhall ſo long remain in its Natural State, as there is a due and juſt mixture of moiſt and dry, under a fitting dominion of heat: and the Deſtruction of a mixt Body muſt proceed from the ſeparation of the moiſt and dry parts: which muſt ariſe from the abolition or abatement of Natural Heat. For the Natural heat diminiſhed or aboliſhed, can no longer retain the dry parts joyned to the moiſt. Now the Cauſe which weakens the Natural heat, is the heat of the Ambient Body, which if it be ſtronger, calls forth the Natural. For the Natural heat being encreaſed by the ambient heat, loſes the proportion it ought to hold to the paſſive Qualities, and therefore vapors away, and leaves the mixt Body; whereof the moiſt and dry parts being deſtitute and having loſt their governor as it were, they become ſeparated, and the moiſt parts are carried with the Heat as its conveiance, into the outſide, and ſo vapours away; and ſo comes putrefaction, which is only the deſtruction of a mixt Body, conſidered as ſuch. I ſay the Natural deſtruction, that is, which happens according to the Laws of Nature Univerſal, which wil have all mixt things ſubject to corruption, and to be at laſt reſolved into the Elements whereof they were made: as violent deſtruction of a mixt Body is when the whole is changed into one Element, as by burning, or alſo by overmuch cooling, as ſome will have it.

Putrefaction is oppoſed to the generation of mixt bodies.

All this whole Nature of Putrefaction *Ariſtotle* in the 4. *Meteorol. Cap.* 1. hath comprehended in this definition: *Putrefaction is the corruption of the proper and Natural heat, which is in every moiſt Body, by the Heat which is without the ſame, Namely, in the ambient Body.* Which Definition contains all the Terms of a perfect Demonſtration, and Demonſtrates a proper Affection of its proper ſubject, by its proper Cauſe. The proper ſubject is *a moiſt body.* For nothing can putrefie, unleſs it be moiſt. And therefore *all mixt Bodies putrefie, inaſmuch as they are moiſt.* The next poſitive cauſe is the *Heat of the Ambient Body*; which is not only Air and Water, but every thing containing, which overmuch augments the internal heat, and diſturbs the proportion which it bears to the reſt of the Qualities. Its adjunct is the Corruption of the internal Heat, and of the ſubſtantial form it ſelf.

The definition of Putrefaction.

Its ſubject

The next Cauſe.

Its adjunct.

From theſe things thus explained an anſwer may be made to many Queſtions. For hence that Queſtion may eaſily be anſwered, *Why all things which putrifie become at laſt cold?* Although in the beginning they were hot. The cauſe of the former is the corruption of the inbred heat; of the latter, both the external heat alſo, which encreaſes the internal, is the Cauſe; and becauſe the internal heat, the proportion being

Why all things that putrifie become at laſt cold?

ing disturb'd which it bore to the rest of the Qualities of the mixt Body, going out, doth more shew it self to the sense. For in the mixture it was so tempered, and joyned in such a league of friendship as it were with the rest of the Qualities of the mixt Body, that it could hardly be perceived by the sense; which League being broken in the Putrefaction, it becomes more sensible; and acts more freely.

Why things putrifying, become at first moist and then dry?

And upon this foundation depends that same distinction of Physitians, whereby they say, that some things are actually Hot or Cold, others potentially: and they say that Pepper, Ginger and Wine, are only potentially Hot, because they are not hot to feel to, but only when they are within the Body, and dissolved by the heat of the Stomach. For the Cause hereof is, that Pepper, Ginger and Wine, although they contain much heat in them; yet the same is so tempered with other Qualities, that is doth not put forth its force, while it sticks in the mixt Body abiding in its Natural condition. But when a man hath taken them into his Stomach, that same harmony of qualities is dissolved and disturbed by the heat of the Stomach, and the Heat of these mixt Bodies is called forth; which doth work more freely and strongly, (the friendship it had with the rest of the Qualities being now broke) no longer as the heat of a mixt Body, but rather as heat now separated, and left to its own Liberty.

And the Cause is the same, why things putrifying become at first more moist, and at last are quite dried up. For the moisture together with the heat vapors out, flows abroad, and goes to the outward parts; Which at last being quite dissipated and evaporated, the mixt Body turns to Dust and Ashes. Also hence a Reason may be given why mixt Bodies in hot Seasons and places do sooner putrifie then in cold; and why things very hot or very cold do not easily putrifie. The Cause of the former is, that in cold times and places the heat of the Ambient (if any remain therein.) is not so strong as to be able to cal out the internal heat: but in an hot time and place the Contrary happens. And the Reason of the latter is, because both a strong internal cold resists the heat of the Ambient, so that it cannot corrupt and cal out the inbred heat; and a strong internal heat doth not suffer it self to be overcome by the heat external. Nor can an external weak heat so intend an internal strong one, that it can be no longer fit to conserve the mixt Body. Hence also a great Quantity is less apt to putrifie then a smal one; because in a great Body there is more heat or cold, which also doth more strongly resist the external heat. Also a thing moved doth not so easily putrifie, as that which rests, because it is less subject to the action of the ambient heat.

Why mixt bodies sooner putrifie in hot seasons and places.

Why things very cold or hot do not so easily putrifie.

Why a great Quantity is less apt to putrifie then a smal one, and that which is in motion then that which rests.

Now from what hath been said the Nature of putrefaction is sufficiently apparent: and yet many dispute at large, whether it be only one, or there be divers sorts thereof. We, omitting tedious disputes, do acknowledg only *one* putrefaction, viz. That which is explained, in the foresaid definition of *Aristotle*. Yet we grant there is some diversity in the putrefaction of things, because of the Various Nature and constitution of the mixt Bodies which putrefie. For those things do perfectly and totally putrefie, which are perfectly resolved into the Elements whereof they were made, so that all the other Elements evaporating, there remains nothing at last but Earth: and thus all those things putrefie which have much Earth in them.

There is only one putrifaction.

But those things putrifie imperfectly and in part, which contain more moisture in them. For seeing the moisture which is more abundant in them cannot be with the heat totally drawn out: only some parts thereof, especially the more thin and subtile are drawn out, and the rest are preserved; and this is termed putrefaction according to part; the Nature whereof is nevertheless the same with that of the putrifaction before defined. For herein the internal heat is corrupted by the external. After this manner Wine putrifies, and the Humor in our Bodies; the three Elements, Air, Water, Earth, inasmuch as they are not pure, but in some measure mixt with other things. The Fire alone does not putrifie, for this Cause especially, because nothing is more hot then it, which may corrupt and cal out its heat. But whether or no in this imperfect putrefaction the form of the mixt Body do quite perish, and a new mixt thing be produced, or whether only some alteration be made, is a doubtful case. We answer briefly: in every true putrefaction somwhat is corrupted: but of an imperfect putrefaction there are more degrees,

The Fire doth not putrifie.

Whether the form be abolished in putrifaction.

one

one greater another leſs. For ſomtimes the putrifaction is ſo light, that ſome particles only being corrupted, the mixt Body doth ſtil retain its proper form: but ſomtimes again it is ſo great, that though the whole mixt Body be not quite reſolved into its Elements, yet the whole form thereof is aboliſhed, and the ſaid Body changed into another ſort. And therefore al Putrefaction is Corruption, and not Alteration only. For although the Blood which putrifies in the Veins, is not wholly corrupted, but only altered in part: yet thoſe parts which are ſaid to putrifie, are really corrupted according to their ſubſtance, and cannot return to their Natural ſtate, but muſt be evacuated by Purgation: but the others which are not corrupted in their ſubſtance, are not properly ſaid to putrifie, but only to be heated by the putrified parts.

Chap. 4. *Of Temperament and Coction.*

HAving treated hitherto of the Elements, their mutual action and paſſion, and the Generation and Corruption of mixt Bodies: before we come to the ſorts themſelves of mixt Bodies, we muſt add ſome things concerning temperament and Coction.

As for what concerns temperament, certain it is that it depends upon the mixture of the Elements, and ariſes from the action and paſſion of the firſt qualities: yet what it is, is not ſo manifeſt. We, omitting the opinions of *Fuchſius* who not rightly aſſerts in the 1 *of his Inſt. Med. S.* 3. *C.* 2. That a Temperament is a ſubſtance, not an accident, and of others who hold that a Temperament is a bare Relation and Harmony of Qualities, as alſo of others, which are by other Authors reckoned up; we hold, that *a Temperament is one Quality, ariſing from the mutual action and paſſion of the firſt Qualities in mixtion.* For the fight of the firſt Qualities, which is neceſſary to the Generation of a mixt Body proceeds ſo far, till they be all refracted and abated, and having caſt away certain degrees of Contrarieties, by which they were at extream variance, Friendſhip being made, as it were, they joyn and grow together into one Quality. And ſo a temperament is nothing elſe but one Quality of a ſimple Eſſence, which is made up of the remiſs degrees of the four Qualities. For as of the remiſs degrees of the Elementary forms one ſimple actual form doth ariſe, which nevertheleſs contains them all in its faculty: ſo out of the firſt Qualities there ariſes one moderate and actually ſimple Quality which potentially contains them all. But we muſt not ſay (which opinion as ſome learned men tell us, is ill fathered upon *Avicenna*) that a Temperament is a certain fift Quality, diverſe from the four firſt, and ſuperadded to them; but only a middle one, ariſing from the others abated and conjoyned, and containing them in it.

Whence temperament depends?

But ſince the Elements are in ſundry manners mixed, and the firſt qualities are tempered together in ſundry proportions; hence there ariſe ſundry differences of temperaments. For if the Elements and Qualities concur to the mixture in ſtrength and degrees perfectly equal, a temperament is effected, which is called *Equale ad pondus*, Equal in weight; as if in it the degrees of the Qualities were weighed and diſtributed in an equal weight; alſo abſolute equality, becauſe comparíſon is not made to any extrinſecal thing. Now this is to be underſtood of the equality of degrees. For the Elements cannot be mixed in equal Quantity; ſince the efficacy of Fire is much greater then that of Earth; and therefore if they ſhould concur in equal portions, the Fire would not generate a mixt Body, but only Fire: and experience teſtifies, that all perfectly mixt Bodies do obtaine very much Earth, by Virtue whereof they become heavy. Though ſome deny that this temper is to be found in Nature; yet we ſee no firme Reaſon to hinder us from holding, that the contrary qualities may meet in the ſame degree, to the conſtitution of a mixt Body. Yea and *Galen* ſaies that this is the Rule of all the reſt, and that the reſt cannot be known without it, *in his B. de Temperam. C.* 3.

The differences of temperaments.

Temperament ad pondus, what it is?

Whether there be an equal temperament.

A temperament equal according to justice, what it is?

There is moreover as yet another equal temperament, which is called equal *ad Justitiam*, wherein the qualities concur, not in a degree absolutely equal, but in such a manner as is most convenient to the form of the mixt bodie and to the performance of its generations, and which holds a medium amongst mixt bodies of the same sort. For one mixt body of its own Nature is hotter, another colder; one moister another dryer. The temperament of a Lion is more hot then the temperament of a Fish; flesh is hotter then a nerve; a bone dryer then flesh. And although in this manner this tempertment may be called equal, *viz.* because that equality is kept therein, which is convenient to every mixt body, and according to Geometrical proportion every one hath his own: yet in respect of a temperament absolutely temperate and equal, it is termed unequal; and that body furnished therewith may be termed intemperate: although commonly that is called intemperate which is departed from the temper which Naturaly it ought to have.

Eight sorts of temperaments equal in respect of justice.

Now how many sorts there are of this temperament Authors agree not. We hold with *Galen*, 1 *de temp. C.* 8. For when only one quality superabounds, and overcomes its contrary, the two rest keep equality; for examples sake, if any mixt body should have five degrees of Heat, and three of cold, and four of moisture, and as many of dry; it should be called a simple temperament. Of which there are four sorts; hot, wherein heat exceeds cold, and moisture and dryness are equal; cold, wherein cold exceeds heat, and moisture and dryness are also equal; moist, wherein moisture exceeds dryness, and heat and cold are equal; dry, wherein drineſs exceeds moisture, and Heat and cold are also equal. But when two Qualities exceed the other two, 'tis called a compound Temperament; of which there are againe four sorts, according to the four possible combinations of the four first Qualities; *viz.* Hot and moist; hot and drie; cold and moist; cold and drie. According to these differences a thing is said to be temperate or intemperate: but after several manners. For a thing is said to be so and so, absolutely or respectively. Absolutely only the Elements are hot, cold, moist, drie; seeing in them only these qualitiesare sincere and pure. Now by comparison and exsuperance a thing is said to be so, which though it have all the Qualities, yet one excells the rest; so that is termed hot which hath more heat; and that cold, which hath more coldness. Now this comparison is made to four things; either to the universal Nature of all mixt bodies, wherein if you can conceive any thing of an indifferent temper, such as is the skin of a man, especially that on the palms of his hands and the tops of his fingers, (unto which therefore they refer the judgement of all temperaments;) all other things in respect thereunto will be called intemperate, and according to the Quality exceeding this Mean, they shall be called hot, cold, moist, drie; Or the comparison is made to the next kind; as if in the whole kind of Living Creatures you shall conceive some one to be temperate, as perhaps Man is; all other animals shall be called intemperate, the name being borrowed from the exceeding Quality: or comparison is made to somewhat Indifferent, in the same sort; so a young man is said to be hot, and an old man to be cold: or finally, comparison is made betwixt divers sorts, or any obvious individualls. So a dog, in respect of a Lion is cold, in respect of a Fish hot. So *Peter* compared to *Paul* is hot: but if you compare him to another more hot, he is cold.

How many waies a thing is said to be temperate, and not temperate

And this may suffice to have said in this place concerning temperaments: let us proceed now to concoction, which is a certain perfection and compleatment of the temperament. Now thus *Aristotle* (in his 4 *Meteor. Ch.* 2.) Defines concoction. *Concoction is a perfection, by the Natural & proper Heat, made of opposite passives, which are the proper matter to each one.* This definition as every orderly definition of adjuncts or accidents, hath in stead of kind the form, in stead of difference the subject, with the efficient cause: all which are to be considered in this place, that we may attain the perfect knowledg of Digestion or Concoction.

The definition of concoction

The form of concoction.

The Form of Concoction is nothing but the ultimate perfection of the proper temperament of a thing. For then a thing is said to be concocted, when it hath attained that perfection and compleatness, in its qualities or temperament, which it ought to have. And therefore that perfection is here to be understood which consists in Qualities, and not that which is Essential, proceeding from the substantial form. Which also *Aristotle* signifies *in the* 12. *Sect. Prob.* 7. *Concoction is the alteration of the thing concocted.*

The matter or subject of concoction are the two passive Qualities, but especialy moisture. And hence it appears, that coction is an affection of a mixt bodie, as it is moist, and that it doth not belong only to the meat of living Creatures, because other things also are said to be concocted, which can never become nourishment for animals. Hence also t'is manifest, that coction belongs to a thing already engendred and constituted by its own Nature. For nothing is said to be concocted, but that which is already engendred, only it hath imperfection in its temper, which must by further alteration be perfected; which being done the thing is said to be concocted. *The Subject.*

As to the Efficient Cause: *The beginning of perfection* (saith *Aristotle*) *comes from the proper heat of the subject, although it be perfected by some outward help.* The principal cause is alwaies the proper heat of the thing; although sometimes it be not sufficient, and therefore stands in need as it were of another Assistant, that the concoction may be thereby better and more rightly performed. So Bathes and Plaisters help the Concoction in the Stomack. So Medlars and other Fruits being gathered before they are ripe and laid up, are ripened by their own Heat: yet the Suns Heat contributes much towards their more happy ripening. *The Efficient Cause.*

This therefore is the manner of the whole business of concoction. When as in a mixt body, already constituted by its form, there is as yet some imperfection in the temperament, and the moisture is not sufficiently mastered and tempered, nor holds a just and exact proportion to the drines and other Qualities: the Natural Heat consumes and excels the superfluous moisture, and that which remains and offends not in quantity, it restrains and limits, and unites it with drines, as much as the Nature of the mixt Body requires; which action is termed coction, or concoction. *The Manner of coction.*

And that the Nature of concoction may be the better understood, *Aristotle* besides the internal End, which is the same with the form, adds also an External one, in these words: *The end of concoction in some things is their Nature, which we call the sort as it were & Essence; in others it tends to some subject forme, when the Humidity is become such and so great.* In which *Aristotle* Teaches, that the External End is twofold; either the form simply and absolutely, which End chiefly appears in the ripening of Fruits, which are then said to be ripe, when the seed is now so perfect, as that it can breed its like: or some form or disposition, to the affording some utility, which consists either in the induction of a new form, or in preparation for the convenient expulsion of things unprofitable. The former use appears in that boiling of the meat, performed in the stomack. For that is therefore ordained, that the meats taken in might by the faculty in the stomach be turned into *chylus*. For such also is the Natural Concoction of flegm. The other appears in the Concoction of putrified humors in ulcers, and elsewhere in the Body of an Animal, which are then concocted and ripened, when they are so laboured by the Natural Heat, as to become apt for expulsion. For since by reason of their great corruption they cannot arrive to any perfect form and profitable to nourish the Body, they are by concoction brought to some form better at least then putrefaction. And thus Concoction doth repress Putrefaction, and puts an End thereunto, and severs the corrupt humors from the profitable, and renders them fit to be euacuated without hurt to the Body. *The External End.*

Things therefore are said to be concocted, when the matter of coction, which is chiefly moisture, shal be overcome by heat and bounded thereby, and have received it's fitting thickness. And therefore Urines, Dung, and all the excrements of our Bodies in like manner, being rightly digested, are a signe of Health. For they declare that the Heat hath its full power in our Bodies: and that it is so much as to be able to restraine and duly to tame and keep in order all the humors. And for the same Cause, all things being digested become thicker and hotter. For Heat which bears the Rule in concoction, doth both Heat and Resolve the thin Parts. Which is also confirmed by Experience. For Apples, Pears, Grapes, and all other Fruits, before they grow Ripe are colder then they are afterwards: and Milk, Seed, Quittour in Ulcers, and Filth gathered in the corners of the Eyes, are thicker when concocted then before. Howbeit, we must here take notice, when it is said, that things Concocted are thicker and hotter then Unconcocted, that one thing must not be compared with another of a distinct sort, or with it self after it hath changed its *species*; but the same sort of thing being unconcocted, must be compared with it self concocted.

To

The definition of Crudity. To Coction is opposed Crudity, or indigestion, which is by *Aristotle* in 4. *Meteor.* thus defined: *Crudity is an imperfection of the passive Qualities, through the defect of proper heat in the subject. And the defect of heat is cold.* From which definition it is apparent, that in Crudity all things are quite contrary to what they are in Coction, saving the subject, which is one and the same. For the Form was there perfection, and here it is imperfection; there the efficient Cause was heat, here want of heat, or Coldness. And therefore those things are generally to be called Crude, which have not as yet obtained those degrees of perfection in the Qualities or Temperament, which they ought to have; and in which moisture abounds, and by reason of the weakness of Heat cannot be rightly mastered and Limited.

Coction is not an univocal kind. Having explained the Nature of Coction and Crudity, let us now come to their Sorts. Where it is first to be observed; That Coction is not an univocal kind, but of the number of those which are called *Pros Hen*, to one, and that therefore its definition doth chiefly agree to the principal and primary sort (which is the manner in defining those things which are said of some one) but a little change being made, they may also be accommodated to the rest. Now the primary sort of Coction, and which can perhaps alone perfectly bear the name of Coction, is ripening, which it self also nevertheless is not equally applied to all the sorts contained there under. For properly *Ripening is the Concoction of that Aliment which is in the Pulp of an Apple, Pear, or any other fruit.* But for more easie understanding sake, *Aristotle* applies Maturity, or Ripeness, only to fruits; though it be common to all Animals, Plants, and Seeds when referred to Generation. Now then Maturation is said to be made, when the Seed which is contained in the Pulp of the fruit is so Elaborated, that it is able to beget its like. For at first, when there is as yet a superfluous moisture remaining, the Seed is not yet fit for Generation: but when the humidity shall by the Natural Heat be partly consumed, partly better terminated, the Seed becomes fit for Generation. Again, Figuratively, Flegm, quittor, and other Humors in our Bodies are said to be Ripened, when they are by the Natural Heat so digested, as either to become fit to nourish, or if they cannot nourish, that at least they may be disposed to Evacuation. Now, by ripening, flatulent things become Watry, Watry things become thin; thin things become thick. For at first the spirit, or flatulent matter is digested by heat; afterwards, the Watry Humor is further digested, and its thinner parts are resolved.

Ripening what it is?

What immaturity is? To Maturity or Ripeness is opposed Immaturity or Unripeness, which as Maturity is also twofold: one properly so called, another figuratively. For immaturity properly so called is the rawness of the nourishment which is in the Pulp of an Apple or other fruit, by Reason of the Penury or ill proportion of the Natural heat. For when the Heat is so little, or the Humor so plentiful, that the Heat cannot exactly master the moisture, there arises immaturity, and then the Seed is not fit for Generation. And therefore all unripe things are windy, watterish, and their Humors thin and cold, unfit to nourish. And afterward Figuratively, Catarrhs, Spittle, Quittor in Ulcers, and Urin are termed crude. Also Milk unboiled is termed crude or raw; as also Tiles and all Earthen Ware, is termed raw, before it is baked.

Another sort of Coction is *Boyling*, which *Aristotle* in the *fourth of his Meteors Ch.* 3. thus defines: *Elixation or Boyling, Generally, is the Concoction of somwhat Indeterminate in an Humor, caused by a moist heat.* For boyling is thus made. A fiery heat being received in a Watry moisture, doth moisten the thing to be boyled, opens its pores, and makes them Wider, and so draws the moisture of the thing to be boyled from the Centre to the Circumference; and the rest of the Humor which remains, it digests, Tames, and Terminates; and therefore boyled things have less Native moisture, and more of that which is forreigne. And for this cause, Cooks that would Roast Meats carefully, do first perboyl them, *viz.* that some of that Humor and Excrements which are within, may be first drawn out, so that the rest may be by roasting more easily consumed.

From the premises it appears, that those things only can be boyled which have moisture, which by the fiery heat which is in a Watry moisture may be overcome. And that those things cannot be boyled, which either are Earthy, and have in a manner

manner no moisture, as Stones, Bones, &c. Or which have indeed some moisture, but which is so condensed and Joyned with an Earthy dryness, that by a moist heat it cannot be called out and Vanquished, as Woods, Metals, &c. And for this very cause, the flesh of old Animals is hardly boyled tender, in comparison of yonger; and Beef is harder to boyl then Hens-flesh: because the former are more dry, Earthy, solid and compact, and have their moisture more tenaciously fastened with their dryness, so that it cannot easily be called out by a moist heat. Also Woods, Metals &c. though improperly, are said to be boyled. For though they are not so softned as things really Boylable: yet some of their moisture is drawn forth, and communicated to the Water; which, the tast the Water receives by their boyling in it, doth witness. Also boyling is attributed to a moist Body that hath little dryness in it, as to milk, new Wine or Must, and other things, *viz.* When by boyling some parts of them do vapor away, and the remaining parts do receive some change in their temperament and tast.

To boyling is opposed imperfect boyling, which is called *Inquinatio* and *Flaciditas*, which is defined by *Aristotle* to be, *The Inconcoction of that which is undetermined in a Body, by Reason of want of Heat in the moist thing which compasseth the same about.* For this Inquination or Flaccidity, is properly nothing else but a boyling begun, *viz.* when the Heat which is in the Watry moisture is indeed so great, that it can in some measure act upon the thing to be boyled: but is not so strong, that it can perfectly Boyl the same, but either by cold or overmuch moisture in the thing to be Boyled it is blunted and overcome, that it cannot perfect its work: which kind of imperfect Concoction oft happens in Aged and Sick People, whose Heat doth in some manner alter the meats, but cannot perfectly digest them. *Imperfect boyling, what?*

The last sort of Concoction, is *Optesis*, roasting; *Which is a Concoction caused by a dry external Heat.* For if in a mixt body the abounding humor be consumed and tempered by a dry external Heat it is called a Roasting. Now roast meats are without indeed dry, but within moist with a moisture of their own, and more moist then boild meats themselves. For the dry heat withers the external parts, and straitens the pores, that the internal Humor can find no way out. Now roasting and boyling are chiefly caused by Art, and these names do chiefly belong to them, as being becaus Artificial best known to us. Yet the same things are also done by Nature. For the Concoction of Aliments in the bodies of Living Creatures, and especially that in the Stomach, is boyling: also the same may not unfitly, in Hot and Dry Bodies, be called roasting. *Roasting what?*

To roasting also is opposed Semiustulation, Toasting, or raw-roasting. Now bad roasting is caused through want of heat, which either is little of it self, or not so great that it can possibly overcome a great aboundance of Humor, and therefore it perfects not the begun roasting. *And so much touching Concoctions.* *Raw-Roasting.*

THE

THE FOURTH BOOK.

Chap. 1. *Of Meteors in General.*

Mixt Bodies twofold.

HAving spoken hitherto in General of the Elements the principles of Natural Bodies, and their mixture; of the Generation of Natural Bodies and their corruption: order therefore requires, that we should now treat of the several sorts of Natural Bodies. And seeing that mixt Bodies are twofold, perfectly and imperfectly mixed; and the imperfectly mixt are the Meteors: we must now come to that part of Natural Philosophy, which all the Ancients (as *Aristotle* in his 1. *B. Meteor. C.* 1. *tells us*) called *Meteorologia*, the Doctrine of Meteors.

Later writers do here indeed raise a scruple, and some deny that a Body imperfectly mixed and a Meteor are one and the same thing; and they say the name of Meteor is of a larger extent, since there are many Meteors which are not Bodies, such as those things which happen only as an apparition as Thunder, Lightning, Earthquakes: others again conceive that the term Meteor is only to be given to bodies imperfectly mixed, and therefore they exclude those things as Thunder &c. which have no subsistency, out of the Number of Meteors; since all things which make up the subject of Natural Physosophy, and are parts thereof, must be in the number of Natural Bodies. But this Controversie may easily be composed. A Body imperfectly mixed must be somewhere explained in Natural Physosophy, and indeed most fitly next after the Elements: and therefore tis said to be the subject of that part of Natural Physosophy. And seeing the same affords matter for Meteors, that part of Natural Physosophy is called *Meteorologia*, the Doctrine of Meteors. For though in it are also explained those things which are not Natural Bodies, as hath been said; yet those very things are either the Adjuncts or Effects of Bodies imperfectly mixed. Hence use hath obtained, that under the term Meteor, both Bodies imperfectly mixed and their Adjuncts and Effects should be comprehended.

A Meteor what it is?

And so the subject of this Doctrine is *Meteoron* a Meteor, that is, *Somwhat raised out of the Earth and Water by force of the Stars and the under-ground Fire, and bred for the most part aloft in the Air.* For the word *Meteoron* in general doth signifie a thing sublime, Elevated, and hanging as it were up on high.

And by aloft or on high we understand, not the Heaven, but all that space which reaches from Earth to Heaven, which place is called upwards, or above. Yea and since *Meteoron* signifies somwhat Elevated and suspended on high, even those thing also which are made in the Caverns of the Earth, of exhalations there raised up, are comprehended under this Name. For all things contained under this name are not of one kind, as hath been said before. Hence some divide them into Hypostatical and Emphatical. They are most conveniently distinguished into three Ranks. For either the Nature of a Meteor consists in the changing of an exhalation into some other thing, which happens in fiery Meteors, Rain and such like; or in motion, as in Winds, Earth-quakes; or in the Reflexion of Beams, as in the Rain-bow.

The Difference of Meteors.

The Efficient cause of meteors

Most do hold the efficient Cause to be Heaven, and the Heaven and the Sun are the chief cause which raises exhalations: but they are not the only cause, but heat also

alſo concurs and the ſubterranean fire; and in the Generation of Metals and Minerals many exhalations are raiſed, as is known to thoſe that ſearch after Metals; and Winds and other Meteors are bred no leſs in the Winter, when the Sun beams are weak, then in the Summer.

The matter The remote matter, are not only the four Elements, eſpecially the Earth and Water, but alſo mixt Bodies, out of which oppoſite exhalations are wont to be raiſed. The immediate matter is a twofold kind of exhalation, raiſed out of them being heated. For the Heavenly Bodies, eſpecially the Sun, and the Subterranean heat do excite and raiſe up a twofold kind of Exhalations: whereof the one which is termed *Atmis*, that is a vapor, is hot and moiſt, raiſed out of the Water or moiſt ground, being of as it were a middle Nature betwixt the water and Air, ſo that it may eaſily be changed into either Element. For it is moiſt in the higheſt degree, but heat is therein remiſs, and ſome degrees of coldneſs, or portions of Water carried up therewith, do remaine in it; and as *Ariſtotle* ſaies in the 1 *Met. Ch.* 3. A Vapor is as it were potentially a Water. But the other Exhalation is called a Fume, or a Smoaky Exhalation; and it is Hot and Dry, raiſed out of the Earth, and eſpecially the drier parts thereof, heated and attenuated by force of the ſtars; of a middle Nature as it were betwixt Fire and Earth. For this Exhalation is exceeding dry, and moderately hot; for it retains ſome degrees of the Earths coldneſs, or rather ſome parts of the Earth it ſelf Elevated with it. And therefore *Ariſtotle* in the ſame place ſaies, that this Fume is potentially, as it were, Fire. Now there are chiefly two ſorts of Fumes, the one of which is termed *Ecphlogoſis* a flaming Fume, which is raiſed out of a Fat matter and is apt to take flame: another which is raiſed out of drier ground, and doth not ſo eaſily take Fire, but rather turns to Winds and Blaſts. Theſe two kinds of Exhalations though they are of a diſtinct Nature, and both in reſpect of their Heat, drineſs, Levity and Original differ one from another; (becauſe a vapor is Cold, Heavy, Moiſt, raiſed out of the Water; but a Fume, Hot, Light, Dry, raiſed out of the Earth:) yet for the moſt part they are bred joyntly, and both together, Becauſe in moſt places the Earth is mixed with Water: whereupon that which of its own Nature is Heavy, by help of the other lighter, is lifted up and raiſed on high; although when they come to the middle Region of the Air they are ſeparated, and the Fume is raiſed higher, but the vapor ſettles beneath. And theſe two Exhalations as they are commonly called are the matter of all Meteors; whence alſo it is that they are called Bodies imperfectly mixed; either becauſe they do not conſiſt of all the Elements, or becauſe in them the forms of the Elements are kept perfect and intire, and do not incorporate into the form of one mixt Body. For which Cauſe alſo ſuch kind of Bodies cannot long laſt. Yet it is wont many times to happen, that Atomes alſo of bodies perfectly mixed are mixed with theſe Exhalations; yet ſo as that theſe Exhalations are not informed by the forms of perfectly mixt Bodies, but only touch the ſaid mixt Bodies.

The Place. The place where Meteors are ingendred is chiefly the *Air*. For it according to the divers Regions whereinto we have ſhewed it is divided, doth afford place to divers Meteors, as we ſhall afterwards declare. For even thoſe alſo which are ſaid to be ingendred in the Earth, are properly ingendred in the Aire contained in the caverns of the Earth. Howbeit in the Sphere of Fire, and eſpecially in the Loweſt part thereof, it muſt not be denied, but that Fiery Meteors are generated. Alſo upon theſe, *viz.* the place and matter, depends the chief diſtinction of Meteors. For ſome conſiſt of an Exhalation, others of a vapor: ſome are produced in the upper, others in the lower Region of the Air. We ſhal begin with thoſe which ariſe from an Exhalation, and among them with thoſe which are commonly termed fiery and inflamed Meteors.

Chap. 2. *Of Fiery Meteors.*

THe greateſt part of fiery Meteors are bred in the upmoſt Region of the Air. For when Hot and Dry Exhalations do aſcend thither and are there inflamed, ſundry fiery Meteors are ingendred, which differ according to the various diſpoſition of the matter, the diverſity of inflammation, their magnitude, Figure, Motion and

Duration: of which though peradventure more sorts might be reckoned up, whose Names are borrowed from the shapes which they represent in their burnings, yet I shall recount the chiefest of them. Now many reckon the *Via Lactea* and Comets amongst fiery Meteors, but of them we have spoken before.

Also very many fiery Meteors do arise, differing only in the posture of the matter, the multitude and shape they represent whiles they burn; which also are to be explained. And that we may begin here: if an Hot and Dry Exhalation, not very thick and Fat, but subtile, stretched out in length and breadth, do take fire in the upper Region of the Air, there appears a burning and shining *Flame*; sometimes with so much brightness, that it doth a little dispel the darkness of the night. Some cal this Meteor, *Burning stubble*, for it represents heaps of stubble suddenly set on Fire.

A burning flame how ingendred.

Skipping Goats. *Skipping Goats* so called, do appear, when the Exhalation is drawn out in length rather then in bredth, having parts not equally disposed, or distinct Masses, Joyned together by thin and rare Exhalations; or they have on the sides certain threds as it were and bristles annexed. For when this is inflamed, the Fire suddenly leaps, either out of the subtile and thin part of the Exhalation into another part thereof; or it runs out into the sides and those Bristles or Appendixes aforesaid, and by and by runs back again; and so it seems to dance, like Goats wantonly Skipping.

Burning brands. Burning Brands are, when the exhalation is drawn out in like manner, rather in length then breadth, having its parts nevertheless equally disposed For if this be set on Fire, it represents a burning Fire-brand or Beam. And these Beams do not move to and fro as Links or Torches, but are quiet, and shine in one and the same place. The *burning Lance or Dart* commonly so called, seems to be the same Meteor with the former. For by these Names a Meteor is designed, which is bred of an Exhalation or Fume, drawn out at length, and having parts of equal thickness, which being set on Fire doth burn all together, and shews the image of a Dart or spear. Nor doth the Perpendicular or Pyramidal Fire, so called, differ much from this, being ingendred of an Exhalation drawn out in Length, and Lighter in its upper part, Heavier in its lower. For being set on Fire in its upper and lighter part, it represents a Pillar set bolt upright; and its lower and heavier part resembles the Basis thereof. Like unto this is the *burning Candle or Torch*, Which consists also of a dry Exhalation, drawn out in length alone, and equally thick. For this being inflamed at one end, and in some measure shining upon the other part not inflamed, it represents a burning Candle or Torch.

A burning Spear or Dart.

The burning Pillar

The Candle or Torch.

Shooting Stars. *Running Stars*, as *Pliny* in the 2. of his Natural History, Cap. 37. calls them: the *Coursing of Stars* (as *Seneca* Phrazes it, in the 1. *Book of his Nat. Quest. Ch.* 14.) Flying Stars as some cal them, and falling or shooting Stars, because they appear in the shape of falling or flying Stars, do happen two manner of waies. First of all when an exhalation in the upmost Region of the Air, drawn out in length, is torn, distinguished and spred abroad into many particles as it were. For the first part being inflamed doth speedily communicate the Fire to the other, the Second to the Third, the Third to the Fourth, &c. After the same manner as one Candle lighted doth easily light again another newly blown out; and so it makes shew of a shooting Star. Again, when an Exhalation subsists in the middle Region of the Air, and either by Antiperistasis of the cold Air is inflamed, made lighter and so raised on high, and shews like a flying Star; or being by the coldness of a cloud compressed and Squeezed, it conceives Fire, and moves downwards, for the most part sidelong, and violently; and then a Star seems to fall from Heaven. Also a third manner may be added, *viz.* When an Exhalation drawn out in length, of equal thickness, and apt to burn, is set on Fire. For this burning all on a sudden, and the flame speedily passing from one part to another, it makes the appearance of a shooting or flying Star. For we must not give credit to the dotage of the *Epicureans*, who taught, that Stars did really fall from Heaven. For, to use the words of *Seneca*, in *L.* 1. *Quest. Nat. Cap.* 1. if this were true, there would have been ere now no Stars left in the Heaven. For there is no Night wherein many shooting Stars appear not. And yet the Stars of Heaven appear in the same place they were in before. They are all as big as before. When many shooting Stars appear, they

they foretell Winds to follow. For they argue ſtore of dry Exhalations which are matter for Winds: whereof *Virgil* in the 1. *Book of his Georgicks or Huſbandry:*

When Stars in Heaven do ſeem to Fall, and make
Through Nights darke Aire, a long and Firie Tracke,
'Tis Sign of Winde.

The flying Dragon.

The *Flying Dragon* is ingendred in the middle Region of the Air. Now this Meteor is made, when an Exhalation not too clammy and hot, meets with a cold Cloud, and is thereby driven back, and ſo either by motion or by *Antiperiſtaſis*, in its upper part, where it is lighter, it is ſet on Fire, and ſeems to vomit Flames and Sparkles; but in its middle part where it is Thicker, and is bowed, it Repreſents a Belly: and in its lower part which is Narrower and Straiter, it Reſembles a Taile.

Willy with the Wiſpe, or Peg with the Lanthorne.

In the loweſt region of the Aire is ingendred the *Ignis fatuus, or Willie with the Wiſpe*, near fat and moiſt ſoiles, pooles, Church-yards, places of Publique Execution where Malefactors are buried, where are ſtore of clammy and fat Exhalations. For they being ſet on Fire, either by *antiperiſtaſis* of the cold Aire of the night, or by motion, do appear like burning candles, and are diverſly moved according to the motion of the Air; and therefore they are called walking lights, and ſometimes they ſeeme to go before a Man, and then again to follow him. For when ſuch as travel in the night would come to theſe Fires, the Air before them being driven by their motion, theſe Fires being alſo moved with the motion of the Air do go along before and fly from them: but when they runſ from the ſaid Fires; the Air behind their backs following them, the Fires do alſo follow. Theſe Fires do many times draw Travellers out of their way, and make them fall into Ditches, Quag-mires, and Rivers: becauſe wayfaring people, ſuppoſing that theſe Fires are Candles ſhining in the next Villages, do make towards them, and leaving the right way fall head-long into the next Rivers and Pooles they come at; Or by theſe Fires being generated about Watry Places, and there ſeeking their Nouriſhment, they are ſeduced into the ſaid Waters. And it is hardly to be denyed, nevertheleſs, but that ſomtimes the fraudulent Illuſions of the Devil doth concur in the Caſe, Who continualy ſtudies the Deſtruction of Man-kind, and ſeeks al occaſons to do harm.

Why when a man followes them, they go from him; and when he runs from them they follow him.

Why they lead Travellers commonly into waters.

Helena, Caſtor, & Pollux.

Alſo of a light Exhalation in the ſame manner are Bred theſe *Meteors* called *Helena, Caſtor and Pollux*, which are wont commonly to be ſeene of *Marirers* at ſea, in the time of a tempeſt: and if two appear, they are called *Caſtor and Pollux*; if one alone, 'tis called *Helena*: and one is counted unlucky, but two a ſigne of faire weather. For ſo *Plinie Lib.* 2. *Nat. Hiſt. C.* 37. *Theſe Stars are of grievous importance, if they come ſingle, and drown the ſhips, and if they fall into the Hole, they burne them up. But if they come two together they are good Signs and tokens of a proſperous voyage, by whoſe coming they ſay the direfull and threatning Helena is chaſed away: and therefore they attribute this Divinity to Caſtor and Pollux*, and ſet their Images on the Ship ſterne as tutelary Deities whom they invoke at Sea; as may be ſeen in the *Acts* of the Apoſtles, *Ch.* 28. *v.* 11. But theſe things are taken rather from Heatheniſh ſuperſtitions then phyſical Cauſes. That appears more true, that when theſe *Meteors* are moved up and down with an unſtable motion, they foreſhew Winds and Tempeſts; and when in the time of a Tempeſt they fall down into the Ships, or ſtick to the Maſts, they are a ſign of faire wether and a Calme. For now they ſignifie that the blaſts of the Winds and the Tempeſts do abate. Howbeit concerning the Star *Helena*, thus *Cardan* writes *in his* 2 *B. of Subtilties P.* 69. Of the ſame kind wellnear is the Star of *Helen* about the Maſt of a Ship, which when it falls melts even Braſs-Kettles, and is a certain Sign of Ship-wrack. For it happens only in grievous Tempeſts, and it cannot but Breed in a moſt groſs Aire, nor be gathered in the Ship ſave by great force of Winds, ſo as to be ſet on Fire, and therefore it portends immediate Deſtruction. The ſame *Author* in the ſame plece, endeavourrs to ſhew a Reaſon why theſe Stars appearing double promiſe ſafety to the *Saylors*, howbeit 'tis ſcarce of any moment.

Fire cleaving to the Haires or Garments of men.

Hitherto also pertains the Fire which is somtimes seene on Mens hairs, and Garments, and on the Hairs of other Creatures, and upon other Things. This arises from a Subtile and Fat Exhalation, dispersed through the Air, and sticking to the Haires or Clothes of Men, or out of the sweats of Animals of an hot Constitution, or heated with vehement Motion, set on Fire by *Antiperistasis*, or by violent Motion. some such thing happened to *Ascanius*, of which *Virgil in the 2 of his Æneids.*

Hexameter verses.

See o'th top of Iulius *Head a glistering Lustre,*
And all about his Locks a Flame, without any burning.

Livie Relates such a like thing of *Servius Tullius*, *Lib.* 1. *Dec.* 1. And *Valerius Maximus*, *Lib.* 1. *Cap.* 6. Also *Livie* writes in *his* 3. *Decad. Lib.* 5. That when *Lucius Martius* was making an Oration a Flame sprung out of his Head, which he felt not, and begot him great Favour among the Soldiers standing about. Most are of Opinion that these Fires do signifie the breaking out of some great Honor or Dishonor, and that they have been alwaies taken as signs of good or bad Luck, as the Histories and Examples aforesaid do testifie. And therefore some deny that they are alwaies to be referred to Natural Causes. That is a Remarkable Passage related by *Cardan*; that a Certain Man came home to his House after one a Clock in the Night, and when he put off his Cloake, a Sparkle flew from the Cape thereof; and when he tooke his Cloake againe and laid it off, it Sparkled againe, so that he was double affrighted; and within 15 Daies he was by his Enemies accused of Witch-craft, and sought for, to be tormented and punished: but by the advice of his Friends He underwent a voluntary banishment.

How thunder is Caused.

Also from the same dry Exhalation *Thunder Lightning and Thunder-bolts* do arise. Touching *Thunder* there are sundry Opinons of the Ancients, as we may see in *Aristotle*, L. 2. *Meteor. C.* 9. Plutarch *de placit. Phylosoph. Lib.* 3. *Cap.* 3. Seneca *in Quæst. nat. Lib.* 2. *Cap.* 17. 18. &c. Lucretius. *Lib.* 6. Nor are late writers of the same judgement concerning the same. For *Bodinus* conceives that Thunder and most other Meteors, do not arise from Natural Causes, but rather from the Power of God, or the Divel. *Aristotle*, whose Opinion is thought to be more probable then the Rest, doth conceive that Thunders are thus generated: When a twofold Exhalation hot and drie, is raised together, and thickned into a round Cloud in the middle Region of the Air: and the Cloud being thickned by Reason of the coldnes of the place, nespecially in the upper part thereof, and the hot Exhalation being shut up therein, and besieged on all sides by the cold, it fights with the cold, and seeking an egress, it runs this way and that way, shaking the sides thereof; or also breaking through the same it makes that noise which we call Thunder. An Example whereof is seen in Guns; when the fiery spirit, proceeding from the Coale-Sulphury Nitre, (to use the words of *Scaliger* in *Exercitat.* 11. *Sect.* I.) cannot be contained in the Room it was in when it was Gun powder, it violently seeks its passage, and suddenly breaks out, making a noise like Thunder. Which happens also in Wood and Chest-Nuts, when they are put into the Fire, containing in them a hot Expiration. For the said Exhalation being rarified, and not finding a place to containe it self, it breaks out of the wood and Chestnuts with a Noise.

Chymical operations declare the generation of thunder

Howbeit Chymical Operations do afford light to this Doctrine, which do not only declare the Cause of Thunder more particularly & clearly; but also shew that the aforesaid Noise is caused not only by the matter shut up and seeking an Egress, but also by the sudden breaking of the Air, caused by the Motion of Bodies, mutually abhorring and flying one from another. For by the aforesaid Operations it is easie to see, that as oft as a part of inflamed Sulphur is added to Nitre, a mighty Noise is Caused. Which also is to be seen in Gun-powder, and in that Preparation of Nitre, which they call *Sal Prunelæ*. Nor doth the common Sulphur only worke this Effect: but the Sulphur also of Minerals and Metals, when Nitre is added thereto, as appears in the Calcination of Antimony with Nitre: but especially in *Aurum Fulminans*, or Thundering Gold, so called, which being set on Fire, strikes with greater force and Noise then Gun-powder, only it moves downwards. Nor is it unknown, that of Nitre, Sulphur, Quick Lime, and Bitumen mixtures

are

are made, which being ſprinkled with moiſture, or wet with ſpittle only, are ſet on fire. Now that force depends not on Sulphure alone, or Nitre alone, but on both mixed together. Sulphur indeed quickly takes flame, but burns ſlowly: but Nitre is not eaſily inflamed, but being once ſet on Fire, it burns quickly away and in a moment as it were. And therefore it is from Sulphur that Gun-powder ſo ſoon takes Fire; but that it burns up ſo ſuddenly proceeds from Nitre, and all the force thereof proceeds from the ſaid Nitre. From whence it is not hard to judg of the Generation of Thunder. For when in the Summer time Sulphurous and Nitrous Vapors are inviſibly raiſed up by the heat of the Sun, eſpecially when the South-winds blow; and afterwards either by the oppoſite Winds, or by the coldneſs of the middle Region they are united and condenſed, it comes to paſs, that they are there inflamed, and hence proceeds the Thunder and Lightning.

Thunder may alſo be made without Clouds

Whence it appears, that it is not altogether untrue, that Thunder or ſomwhat like it may be alſo made without clouds. For Hiſtories witneſs that Thunders have been heard the Sky being clear: and *Pliny* relates *Lib.* 2. *Cap.* 51. That there was a man ſmitten with a Thunder Bolt, on a clear day; and other have obſerved the ſame. Which Thunders may wel be thought to have been bred of a ſpirit and a dry Exhalation, contained in the Caverns of the Earth, and breaking out with great violence. Which thing is made more credible by what *Seneca* relates, *Queſt. Nat. Lib.* 2. *C.* 30. after this manner: Once upon a time *Ætna* was ful of fire: it poured forth an Ocean of burning Sand. All the daylight was darkend with duſt, and the People were frighted by the ſuddain approach of night. At the ſame time tis reported there were very many Thundrings and lightnings: which were cauſed by the concourſe of dry bodies, and not of clouds; for it is not credible there were any clouds, the Air being ſo burning hot.

Lightning what it is?

Alſo concerning Lightning there is ſome diverſity of opinions, as may be ſeen out of the places fore alleadged. Moſt retain the Opinion of *Ariſtotle*, who held that Lightning was an hot Exhalation driven out of a cloud, and ſet on Fire chiefly by vehement motion, and caſting forth a ſhining Light.

Why the Lightning is ſeen before the thunder is heard?

And although the Thunder be before or as ſoon as the Lightning, yet the Lightning is ſeen before the Thunder is heard; *viz.* Becauſe the ſight is quicker then the hearing, and viſible repreſentations of things are more ſpiritual, and more fit for ſudden propagation, then audible. An example whereof we have likewiſe in ſuch as cleave Trees in the Woods, where we ſee the blow light, before we hear the ſound. And in Guns, where we Firſt ſee the Fire before we hear the Report.

A thunder bolt.

A Thunder-bolt differs not much from Lightening; for it is an Hot and Dry Exhalation, more compact then Lightning, ſuddenly breaking out of the Clouds with great force and violence. And therefore it is not alwaies diſperſed in the Air, as moſt other fiery Meteors are, but is carried often to the Earth: both becauſe it is darted out of the Cloud with great force and violence, as alſo becauſe it conſiſts of a matter well compact and cleaving together: yet *Pliny* tells us (in his *Nat. Hiſt. Book* 2. *Ch.* 55.) that it never ſinks into the Earth above Five foot. Hence *Seneca* in *Queſt. Nat. Book* 3. *Ch.* 57. *Lightning which only ſhines, and the Thunder-bolt which is darted down, are made after the ſame manner. But the former is of leſs force, and hath leſs nutriment. And to ſay what I think in a word: a Thunder-bolt is Lightning compact and Vigorated.*

The Nature of the thunder-bolt declared from Chymical Principles.

That theſe things may be explained from nearer principles: the Lightning and Thunder-bolt differ only in the diſpoſition and plenty of the Sulphur and Nitre. For the more plentiful and ſubtile the Nitre is; ſo much more vehement is the blow: and becauſe of the aboundance of Sulphur, there is more appearance of fire. Hence a Cauſe may be rendred why it lightens ſomtimes with Thunder and ſomtimes without. For the reaſon hereof is not, becauſe the Cloud is ſpungy or compact, ſomtimes ſtopping the paſſage of the Exhalation, and other whiles giving the ſame a free Egreſs: (for the Clouds are not ſo thick as to be able to ſtop in the Lightning:) but becauſe there is ſomtimes good ſtore of Nitre, otherwhiles but little joyned with the Sulphurous Exhalation; therefore ſomtimes vehement Thunder, other whiles little or none is heard.

The *Thunder-Bolt* therefore is a fiery and thin Nitro-Sulphureous ſpirit, and not a ſtone as the common people imagin. For the wonderful power and force of the

Thunder-

Thunder-bolt, of which we shall speak anon, must not be ascribed to a stone, but to a Body much more thin and subtile. And if any man will hold, that a most solid Stone may sometimes be bred in the Clouds of Exhalations thickned and coagulated, and be cast down with the Thunder-bolt or Lightning as a bullet shot out of a Gun, I shall not contend with him; yet I think such a thing happens but seldom.

I conceive it comes more frequently to pass, that by reason of a Thunder-bolt falling upon the Earth, the same and what ever matter is apt thereto, is melted as it were by Fire, and out of that fluid matter such a stone is formed; since it is otherwise a well known thing, that Iron and other Metals may be suddenly melted with a Thunder-bolt.

The effects of thunder bolts. The Effects of Thunder-bolts are wonderful. For by it Silver hath been melted in mens Purses, and the Purses no way hurt or harmed: the sword hath been melted, the Scabbard remaining intire; all the Iron hath melted and run down a Post, the Wood unhurt; the Bones in live Creatures have been mashed to pieces and the flesh not toucht; and *Martia* a Roman Lady had the Child in her Womb kild with a Thunder-bolt, her self unhurt, as *Pliny* tels us in his *Hist. Nat. B.* 2. *Ch.* 51. In a word the Thunder-bolt hurts all hard and solid things sooner then such as are light and Spungy. The Cause whereof *Aristotle* saies to be (3. *Meteor.*) because it sooner goes through light and Spungy Bodies, then to be able to hurt or burn them. But in such things as are thicker, while it staies a little seeking a passage which it cannot easily find, it doth the more hurt. And why the Hogshead being broken by a Thunder-bolt the Wine stands congealed, the reason is, because the heat of the Thunder-bolt condenses the external parts of the Wine, that the Wine stands congealed and shut up in a Skin as it were. Yet *Seneca* tels us that this stif-standing of the Wine doth not last above three daies, *Quest. Nat. L.* 2. *Cap.* 31. That also is to be noted concerning the wonderful power of a Thunder-bolt, which *Meuererus* relateth in *Com. Meteorol. p.* 140. How that a certain Minister in the way from *Leipsich* to *Toga*, was so suddainly taken out of the sight of all men by a Thunder-bolt, that he was never seen more.

Whether some things are safe from thunder-bolts? *Pliny* tels us that the Bay-tree, the Sea-Calf, and an Eagle are Thunder-proofe and cannot be smit by a Thunder-bolt. *B.* 2. *Ch.* 55. Some add the Hyacinth Stone, and other coral. Yet most men Count these things but Fabulous, and late authors observe that the Laurel or Bay hath been Thunder Smitten: and *Scaliger* in *Exercit.* 113. disputes against the assertion of *Cardan* touching the Hyacinth. The *motion of a thunder-bolts.* motion of Thunder-bolts is commonly aslope or slanting: because the Fire of its own Nature rends upwards, and the force whereby it is cast out of the cloud drives it downwards. And hence a cause may be rendred, why Thunder-bolts do frequently smite high Mountains, Towers, Temples, Tall-Trees: because seeing Thunder-bolts are commonly moved aslant, the highest things are most Obvious to them, and are therefore more often hurt by them.

At what time of year thunder bolts are most frequent? In Winter and Summer Thunderbolts are rare; in the Spring and Autumn more frequent, as *Pliny* tels us, *Lib.* 2. *Nat. Hist. Cap.* 50. Yet later writers say they are most frequent in Summer, and seldom in the Spring and Autumn; and to their Opinion experience gives witness in our parts; for the hotter the weather, the more Lightnings, Thunders and Thunder-bolts we have. For in great Heats very many hot Exhalations are raised aloft, fit to ingender Thunder-bolts, and through the cold of the middle Region of the Air they are shut up in Clouds, and out of them violently driven down.

The difference of thunder-bolts. As to the difference of Thunder-bolts, *Pliny* divides them (in 2. *Book Ch.* 43.) into Predicting and Brute, perswaded rather by Heathenish Superstition then any Natural Reason. That is a more convenient division of Thunder-bolts, which *Seneca* brings in his 2. *B. of Natural Questions, Ch.* 40. The kinds of Thunder-bolts (saies he) are the Borer, the dissipater, the Burner. That which bores is subtile and flamy, flies through the straitest passages, by reason of the sincere thinness and pureness of the flame. That which dissipates is conglobated, and hath mixt with it the force of a fiery and stormy spirit. And therefore that kind of Thunder-bolt returns and escapes through that hole where it entred in. The force of this Thunder-bolt being spred far abroad breaks what it smites, but doth not pierce through it. The third kind, which burns, hath much Earthiness in it, and is more

fiery

fiery then flaming. And therefore it leaves great marks of burning which abide in the things smitten. Indeed, No Thunder-bolt comes without Fire, but we call this properly fiery, which imprints manifest signs of burning. That which burns and makes brown, doth burn three manner of waies: for either it blasts only and hurts slightly, or it burns, or it kindles.

Strange Colors in the Skie, and Gapings.

To the Meteors whose Nature and Generation hath been Hitherto explained, may not unconveniently be adjoyned the *Phasmata* so called, such as are, wide gapings in the Skies, Ditches, Bloody redness and other Colors in the Skies appearing. For these appear various by reason of the light of Stars or Meteors received in a thick Air, or Exhalations, differing in plenty, Density, and Position. For as a flame appears in sundry Colors, by reason of the various permistion of Fire and Smoak: even so the light of the Stars or Exhalations enflamed, according to the divers dispositions of the matter wherein it is received, doth present to our Eyes sundry Colors and Shapes. For when that which receives the light is very compact and dark, there appears somwhat that is obscure and darkish; if it be not so compact, there is an appearance of a Sky Color; if yet less compact, it appears purple Color'd. And therefore they say a Gaping in the Sky is caused two manner of waies. First, When the light of the Moon, or another Star, or of some Exhalation enflamed (which is I conceive the more frequent cause) falls into a Cloud beneath it, which is compact in the middle, and spungy in the sides. For so the thicker part in the middle, which the Light cannot pierce into, expresses a certain deepness remote from us a great way: but in the outmost parts through which the light passes, it seems nearer to us. For every thing that is black, dark and obscure, although it be as near as that which is white, yet it seems further off then it: for white things do more work upon the sight. And therefore painters also being to express a thing depressed and remote, do use a black Color or that which is near to black; but to express a thing raised and eminent, they use white. After the same manner also Ditches are made. For in them there is only more depth, then in the foresaid Gapings. Of other Colors and Figures appearing in the Air, the Cause is the same. For according to the various disposition of Clouds in their several parts, in respect of thickness and thinness, the shapes of divers Animals are represented, of Mountains, &c. They say that a Gaping is made after a second manner, when a thin exhalation burns above some Cloud, and attenuates the said Cloud in the middle, more and more, so that it seems to be divided into two parts. Which being done, the Exhalation it self appears all on Fire, and the Heaven being as it were opened, seems to burn. Yet probable it is that somtimes such Prodigious Apparitions are by almighty God placed in the Sky, to Denounce some Impendent Calamity, and Experience teaches as much.

A Gaping.

Ditches & other figures and colors appearing.

Chap. 3. *Of the Winds.*

After the Fiery Meteors, we are to treat of Winds and Earth-Quakes. Now although of old sundry Men have had several opinions concerning the Nature of the Winds; and that Opinion chiefly was most Famous and common, which holds that Wind is the Agitation of the Air, or as *Seneca* defines it, *Quest. Nat. Lib.* 5. *Cap.* 1. Flowing or agitated Air: yet that these and other Opinions are of no validity, *Aristotle* shews in *B.* 2. *Meteorol. Ch.* 4. But *Aristotle* himself held thus concerning the Generation of the Winds; that all the Water which falls down in showers, is totally distributed into the Earth, and the Earth hath in it self much heat and Fire; and the Sun doth not only draw that moisture which lies in the upper parts of the Earth, but also by its heating Faculty dries the Earth it self; which Humor being drawn aloft in vapors, is driven back by the coldness of the middle Region of the Air, and agitated and moved athwart.

Wind is not the Air agitated.

The manner of the Generation of Winds according to Aristotle.

For the Matter of Winds, according to the *Aristotelians*, is an Exhalation hot and dry: of which thing they produce these signes. For in the first place Winds do very much dry. (Again as *Cardan* saies in his 16. *de Subtil. p.* 792. (and experience confirmes the same,) red Clouds scattered all over the Sky, or a red Moon, or the Suns setting amongst red Clouds, signifies Winds to follow; only because they

The Matter of Wind

argue

argue that many Hot and Dry Exhalations are Elevated into the Sky. Howbeit the matter of Winds is seldom a pure Exhalation; and some winds are drier then other some, because two sorts of Exhalations, as was said before, are commonly drawn joyntly out of the Earth; and again, because they are mixed with Exhalations and Vapors, through which they pass: and therefore also the Qualities of several Winds are different, as shal afterwards appear, by reason of the vapors they bring with them out of the places through which they blow.

The Efficient cause. Now what should be the Cause of the Motion and Agitation of Winds, authors differ, as may be seen in *Francisc. Piccolhomineus, Lib. de Meteor. Ch.* 22. *Collegium Conimbric. de Meteoris, Tract.* 6. *C.* 3. And verily here is no smal difficulty and obscurity. But most Men hold, that dry Exhalations being carried up to the middle Region of the Air, or thereabouts, are by the coldness thereof driven back; and because by their own Nature they are light and endeavor to mount upwards (but by the violence of the cold Air they are driven down again,) therefore they are forced to move Athwart or Cross the Air. For just as Smoak ascending out of a Chimney, if it meet with Wind is beaten down, and passes obliquely this way and that way al abroad: so they think it no absurdity to say, that an hot Exhalation meeting with the coldness of the middle Region of the Air, is driven back thereby.

Aristotles opinion examined. Now as we do not wholly reject this opinion, since experience it self doth witness, that after Rains Winds are raised in the neighbouring places, vapors being raised out of the Earth moistened with showers; yet some things are to be added and observed concerning the same. For first, though that same violent motion of Winds be chiefly to be attributed to Exhalations: yet the Air it self doth encrease that motion, which being moved by the Exhalations is it self agitated, and forcibly carried this way and that way. Even as when it is moved by ones Hand, by a Whip, or Fann, we perceive it makes somwhat which resembles Wind.

Moreover, although Winds are hardly bred without an Hot and Dry Exhalation, since rarely one kind of exhalation ascends without another: yet nothing hinders but that Cold and moist Vapors may be the matter of Winds; and experience teaches us that there are many cold Winds, and many Winds moist.

Thirdly, 'Tis indeed credible, that out of the Earth moistened with showers many Exhalations do ascend; but Credible it is not, that all the matter of Winds arises from the surface of the Earth, and that the Earth within the compass of ten Foot deep, more or less, can send forth such store of Vapors as will serve to make Winds, which oftentimes out of the same Quarters do most vehemently blow, divers daies together; especially when the Earth continues moist even when the Winds do blow: but without all question the greatest part of Winds do break out of the hollow Caverns of the Earth. For in the Winter Season, when all the Surface of the Earth is hardned with Frost and Cold, yet nevertheless more and more vehement Winds are then raised, then in the Summer time; and Winds arise out of Rivers and Lakes, yea and Storms arise out of the Sea it self. And although some think it improbable, that Winds are raised out of the bottom of the Water, by the working of the Fire which is in the Bowels of the Earth, yet Mariners have oftentimes found it so to be, to their great danger and dammage. For this is that *Æolia* (which *Virgil* describes in his 1. Book of the Travels of *Æneas*,) out of which, as he saies,

> *Huf-puf Winds make all to an Head, and where the Gate's open,*
> *Out they Rush, with a blustring blast, and Blow the Land over.*

Fourthly, Although I will not now dispute this point, whether Vapors and Exhalations raised aloft, are driven back by the coldness of the middle Region: yet nevertheless certain it is, that they when they break out of the Caverns of the Earth, they are not destitute of all force and motion; and that not only an Air arises out of Pools, Floods and lakes, but even out of the Calm Sea oftentimes storms of Wind do arise. Now the Winds in the mean while do receive this force at that time, either from the multitude of Waters which break into the bowels of the Earth, and thrust forth the Air and Vapors there shut up; or from the Fire contained in the

the Caverns of the Earth, and resolving the Waters and other subject matter into Vapors: to which may be added some Huge Fragment of Earth falling down into some vast Cavern of the Earth, and thereout violently expelling the Air. Howbeit, amongst these Causes, the chief seems to be the under-ground heat; and many things argue that it is no less effectual to raise Winds, then the Heat of the Sun. For, as hath been lately said, they break out of Rivers, Lakes, and the Sea also in the Winter time, when the surface of the Earth is hard with Frost. And that same instrument which Chymists use instead of bellows to blow their Fire, doth not a little declare this business. They have a round hollow Globe of Copper, which being filled with Water and close stopped, there is a smal hole on one side or a Pipe with a smal passage: and the said Globe being filled with Water is laid on a Chafing-Dish of Coals, and the foresaid Pipe is instead of bellows turned towards the Fire which they would blow: when the Globe grows Hot and the Water begins to rarifie, there is a perpetual Wind blowing forth, which blows the foresaid Fire like a bellows, til all the Water in the Globe be consumed. To all which causes nevertheless one seems fit to be added, *viz.* The contrariety of those smal particles, whereof the Exhalations which are the matter of Winds do consist. For these particles (as appears by many Chymical operations, wherein for the same cause the Vessels are violently broken, while they abhor and fly one from ther) do raise such a violent motion.

Howbeit, The motion and posture likewise of the Stars, and especially of the Planets, doth also contribute to the Generation of exhalations; which being in this or that part of Heaven constituted, or in conjunction with others, or having mutual aspects; they move somtimes this matter, somtimes that, somtimes in one place, somtimes in another, and variously drive and force the same.

The number of winds vulgarly observed.

The number of the Winds is by various Authors variously reckoned, as may be seen in *Aristotle*, in his 2. *of Meteors*, *Ch.* 6. in the Author of the *Book de Mundo* dedicated to *Alexander* Ch. 4. *Seneca* in his *Quest. Nat.* L. 1. C. 16. *Pliny* in *Hist. Nat. Lib.* 2. *Cap* 47. Gellius, *Book* 2. *Ch.* 22. Who also differ somwhat in the Names and Situations of the Winds. Thus we shal Muster them. All grant that those are the four Cardinal or Principal Winds, which blow from the four Principal points of the Horizon, or the four corners of the World. For from the Equinoctial Sun-rise blows the East-Wind; from the Noone-sted blows the South Wind; From the Equinoctial Sun-set, the West-Wind; and from the Pole Arctick blows the North-wind. The Ancients contented themselves with the notice of these four Winds: the Age following added four more. For, because the Sun doth not alwaies rise and set in the same place, but the Equinoctial Sun-Rise and Sun-set from whence the East and West winds blow, are different from the Solstitial Sun-Rise and Sun-set; and the Winter Sun-Rise and Sun-Set is also different from them: they therfore added yet four Winds more, blowing from the four points of the Intersection of the Tropicks and Horizon, or from the points of the Summer Sun-Rise and Sun-Set, and the Winter Sun-Rise and Sun-Set. For that which blows from the Summer Sun-Rise, they called *Cæcias*; That from the Winter Sun-Rise *Vulturnus*; that which blows from the Summer Sun-Set, *Corus*; that from the Winter Sun-Set, *Africus*. To these Posterity added yet other four, which blow from the Poles of the Zodiack, and their opposite points; or from the sides of the Poles and the Polar Circles, or from the points marked by them in the Horizon; so that every Cardinal Wind came to have two collateral or side winds. And they called that betwixt the North and the Summer Sun-Rise *Thrascias*; and that betwixt the South and Winter Sun-Set, *Libonotus*; that betwixt the South and Winter Sun-Rise, *Phœnicias*. And this is the most usual number of Winds among Authors.

The number of the winds encreased by late Navigators.

Later Navigators have amplified the number of the Winds to thirty two. For they divide the Horizon into eight parts, to which they attribute eight Winds; which they call principal, *viz.* those which blow from the four cardinal points of the Horizon, or corners of the World, and such as blow from the points exactly in the middle of those. To these they add eight others, holding the middle places betwixt the principal, and call them the middle or half Winds: to these they add sixteen more, which they insert in the middle space betwixt the principal and the middle, and cal them Intermediate or Quarter Winds.

I shall here recount the chief of them, which follow one another in this order, from East to South; from South to West; from West to North, and so from North to East again. From the Equinoctial Sun-Rise blows *Subsolanus*, the *East-Wind*; from the middle point betwixt the East and the South, blows *Euronotus*, the *South-East-Wind*; from the South blows *Auster*, the *South-Wind*; in the middest betwixt the South and West is *Notozephyrus*, the *South-West Wind*. From the Equinoctial Sun-Set blowes *Zephyrus*, *Favonius*, the *West Wind*: betwixt the West and North blows *Thrasciozephyrus*, the *North-West Wind*; from the North, the *North Wind*; and betwixt the North and East, the *North-East Wind*.

To these if we shall add eight and insert them in the middle among the principal, (which were also used by the Ancients, and blow from the Summer and Winter Sun-Rise and Sun-Set, and which the sailers call middlewinds or half Winds,) we shal then have sixteen Winds worthy of observation. For betwixt the East and the South-East there is *Vulturnus*, or the East-South-East Wind; betwixt the South-East and the South there is *Phœnicias*, or the South-South-East Wind; betwixt the South and the South-West there is the *Libonotus*, the South-South West wind; betwixt the South-West and the West there is *Africus*, the West-South-West wind; betwixt the West and the North-West is the *Caurus*, *Corus*, or West-North-West wind; betwixt the North-West and the North blows the *Circius* or North-North-West wind; betwixt the North and the North-East blows *Boreas*, *Aquilo*, or the North-North-East wind; betwixt the North East and the East blows the *Cæcias*, or the East-North-East wind.

Contrary winds. The chief thing observeable in these Winds is the contrariety. Now those Winds are most contrary one to another which are most distant one from another in place. Now those are most distant in place which are Diametrically opposite one to another, or by a Line drawn through the Centre of the Horizon. Hence the East is opposed to the West, the South to the North; the Winter Sun-Rise to the Summer Sun-Set, the Winters Sun-Set to the Summers Sun-Rise: and therefore the Winds also which blow from these parts are opposite one to another. So the East-South-East wind is opposite to the West-North-West; the South-East wind to the North-West; the South-South-East, to the North-North-West; South-South-West to the North-North-East; the North-East to the South-West; the East-North-East wind is opposite to the West-South West wind.

The winds blow in a certaine Method. And here it is to be observed, that these winds observe a Rule in blowing. Those which are contrary, because they are Diametrically opposite, cannot blow at one and the same time, but the stronger of the two suppresses the force of its opposite: or if it happen that they blow together, it is with mighty contention and causes an hideous storme. Now, this order the winds do commonly observe, that when one fals that which is next it doth rise; or the contrary to that which ceases doth begin to blow. Moreover in contrary Lines contrary Winds do for the most part blow: concerning which see *Aristotle*, *Lib. Meteor.* 2. *C.* 6. Pliny *in his Natural History*, *Book* 2. *Ch.* 47.

The temper and Qualities of the winds. Again, Here is to be noted the Temperament and Quality of the Winds. For though they al agree in matter, and consist of an hot and dry Exhalation: yet since that is seldom raised up alone, (but that for the most part out of the Sea and the Earth watered with Rains and Snows these two Exhalations are drawn together, & afford matter to the Winds;) moreover that they pass through places Hot, Cold, Dry; therfore there is also a great difference of Winds in respect of the places from whence they arise and through which they blow. For the Winds have not only the Qualities of those places from whence they arise, but their chief qualities they have from the places through which they pass.

Hippocrates in his *Book de Aere, Aqua, & Locis*, divides al the Winds into Hot and Cold, because the force of these qualities is greatest: whom *Aristotle* following in his 2. *Meteor. Cap.* 6. divides all Winds into North and South Winds, even in respect of Heat and Cold also. To the Northern he adds the Western Winds, and to the Southern the Eastern. The North-Winds are the coldest of all other and Dry, for they arise from Snowy cold places, and pass through places out of the Suns way and far from the Heat thereof. With these agree the West Winds. For these are cold Winds, because they pass through places not much heated by the Sun. To the North-Wind the South-wind is opposed, an hot wind, which passes through

through the Suns road, and through places heated by the Sun: in *Libya* indeed it is dry, becauſe the moiſt vapors are there conſumed by the Sun: but to us it is moiſt, becauſe it comes over the Mediterranean or Mid-land Sea. The Eaſtern Winds are Hot and dry. For the Sun is carried long over thoſe places through which they come.

The Eaſt-wind is Hot, Dry, temperate, Sweet, Pure, Subtile, Healthy, eſpecially in the morning: and therefore it brings no Venemous blaſts. The Eaſt-South-Eaſt becauſe nearer the South is moiſt and cloudy, and therefore when it blows all things do ſeem to be bigger then indeed they are, as *Ariſtotle* hath it in the 26. *Section* of his *Problems*, *Problem* 56. The Eaſt-North-Eaſt, is inconſtant and ſomwhat cool. It drives not the Clouds away, but draws them to it ſelf; whence the Proverb: he draws evils to himſelf as the Eaſt Nor-Eaſt Wind draws the Clouds. The Weſt wind melts the Winter Snow and Froſts, being of an Hot and moiſt temper, making the Herbs and flowers to grow; and therefore 'tis thought to have its Name in the Greek *Zephuros*, as if you would ſay *Zoen Pheron* bringing Life.

The Weſt-South-Weſt, is Cold, Moiſt, Rainy, tempeſtuous. Hence *Virgil* calls it *Creber Procellis*, in the firſt of his *Æneids*, ful of Storms. The Weſt-Nor-Weſt, is Stormy, Snowy, Hailing, Cold. Therefore *it*, and the North-wind, are the coldeſt winds of all.

The South-wind is moiſt, Hot, Thundering, Peſtilent, engendring Clouds and Store of Rain, making the Air thick and Cloudy.

The South-South-Weſt is a temperate wind, Hot, Rainy, and ſomtimes Thundering.

The South-South-Eaſt wind is Hot and Moiſt.

Wherefore the South-wind, the South-weſt wind, Weſt-South-weſt winds are hot, but of theſe the South-wind is Hotteſt, Hurtful and Peſtilent.

The South-South weſt is more moiſt then Hot. Howbeit, conſideration muſt be had of the Climate and the place.

The North-Nor-Eaſt wind is Cold and Dry, the Author of Cold, cutting the Clouds, ſtraitning our Bodies and ſhutting their Pores: making the Humors more pure, and Purging the peſtilential Air.

The North-Nor-weſt is the Author of Snow and Hail.

The North-wind is Cold and dry, without Rain, hurting Flowers, Fruits and budding Vines. And therefore the North-Nor-Eaſt, North and North-Nor-weſt winds do Purge the Air; and if they be not vehement cold, they make it clear and fair weather; but eſpecially the North-Nor-Eaſt and the North winds; and the North-Nor-Eaſt brings Hail, and the North-wind brings Snow. And Generally all winds from the North and Weſt are drier then from the South and Eaſt.

Hence ſome winds are healthy, others unhealthy. But in general the Southern winds are of all other moſt unwholeſome. For they cauſe moiſture and putrefaction: and therefore when it blows, neither Cellars, nor Houſes, nor Libraries, nor Granaries ſhould be ſet open. The South-wind is more violent in the Night, the North-wind in the Day: the South-wind on the Sea, and the North-wind on the Land. *Of winds ſome are healthy, others unhealthy.*

A ſhort and moderate South-wind makes the Air clear; but a great and laſting South-wind Clouds the Air, and is wont to be more furious at the End then at the beginning: and therefore it brings more Rain at the Concluſion, then at firſt: but the North-Nor-Eaſt wind doth the contrary.

Thoſe winds which come through Populous places, as Cities ful of people, and where a great Army hath been long incamped, through Stinking and Venemous places, are hurtful: but thoſe which come through healthy places, as pleaſant Meddows, woods, and along running waters, are wholſome, for they are Seaſoned with the Steams of Flowers, Leaves and Herbs. More obſervations concerning the force of winds are to be read every where in the writings of Phyſitians, and in *Pliny* in the place fore alledged; alſo ſome things may be brought out of *Ariſtotle* touching this ſubject, *Probl. Sect.* 26.

And theſe are the common winds which blow every where all the world over. There are alſo other winds peculiar to ſome places. The former are termed com- *Provincial winds.*

mon to all places, not becauſe ſo many blow in all places; for there are ſome Regions where thoſe common winds cannot come, by reaſon of High-Mountains and other Cauſes: but becauſe, no where there are found any more. And the latter are termed Provincial winds, becauſe they go not beyond a certain tract of ground and abide in the place where they were ingendred not being able to blow further: becauſe they are bred of a ſmal Quantity of matter, which failing, they alſo do fade away. And ſuch are commonly thoſe winds which are called *Subterranean*, which come out of Caverns of the Earth, and from Exhalations bred in thoſe Cavities which are neareſt the Surface of the Earth. Or becauſe they are particles of the common winds, ſeparated from them by the height of Mountains, deepneſs of Valleys, or the Heat or Cold of the Place. Of which ſee *Seneca*, *Queſt. Nat. B.* 5. *Ch.* 19. *Pliny* in his Natural Hiſtory *Lib.* 2. *Ch.* 47. Gellius *Book* 2. *Ch.* 22.

Anniverſary winds There are alſo univerſary winds, which return every year at ſet times, and they are chiefly three: The *Onithiai* or Bird-winds, the *Prodromoi* or forerunners, the *Bird wind.* *Eteſiai* or Anniverſary winds Particularly ſo called. The Bird-winds called alſo the Roſe-winds, are a ſort of Weſterly winds, which blow gently every year in the Spring Seaſon, when the Swallows and other Birds returne to our Parts, and *Fore runners.* when Roſes flouriſh. The *Prodromoi* or Forerunners, are Northern winds which come eight daies before the riſing of the Dog-Star, ſo called becauſe they proceed *Eteſian winds.* the *Eteſian* winds. The *Eteſian* winds are ſo called from *Etos Annus*, as if you ſhould ſay Anniverſary winds Particularly ſo called, becauſe they keep their courſe moſt certainly every year, two daies after the Riſe of the Dog ſtar, and blow forty daies together; now they are Northern winds, pleaſing and healthful to man and beaſt. For by their blaſt they moderate the Heat, break the violence of the Summer, and defend us from the violence of the hotteſt months. They riſe at the third hour of the day, and therefore they are called ſleepy winds and Dainty Nice winds by the Mariners, as *Seneca* tells us, *Nat. Queſt. Lib.* 5. *Ch.* 11. and at night commonly they leave blowing. Authors conceive thoſe winds are bred by great heat, melting the Snows yet remaining on the Northern Mountains. For 'tis likely, that the Lands diſburthened of the Snow and uncovered do breath out more freely. And therefore they do not laſt beyond the Dog-daies; becauſe after them all places are bared, or at leaſt very few do continue covered with Snow.

Turbulent winds. The winds do ſomtimes raiſe great Tempeſts, and are exceeding turbulent; the chief whereof are *Ecnephias*, *Typhon*, and *Preſter*. The generation of the wind *Ec-* *Ecnephias* *nephias* is thus deſcribed by *Seneca* in his *Lib.* 5. *Queſt. Nat. Cap.* 12. when a great inequality and diſſimilitude of Bodies, ſent out by the Earths vapor, doth aſcend aloft, and ſome of theſe Bodies are dry, others moiſt, from ſo great a diſcord of Bodies fighting together, when they are gathered into a Globous Body, 'tis like that ſome Clouds are made hollow, and that *Fiſtulous* ſpaces are left in them. in manner of hollow ſtrait Pipes. In theſe ſpaces a thin ſpirit is intercepted, which deſires a greater ſpace, when being ſmitten and cuft together in its narrow paſſage it grows hot, and ſo becomes wider, and cuts aſunder its incloſures, and breaks out into a Wind, which is really ſtormy, coming down from aloft and falling vehemently and fiercely upon us, and making it ſelf way by force and fighting. This wind is called by the Greeks *Ecnephias*, becauſe it comes ruſhing *Ec ton Nephon*, out of the Clouds.

The whirl-wind But if the ſaid Exhalation be divided into parts, and breaks either out of divers Clouds, or out of divers parts of the ſame Cloud, it cauſes a Whirl-wind. For, becauſe the wind ſeeking Egreſs meets another, and is forced as it were out of a wide into a narrow place, it is alwaies driven to one ſide where it may find a paſſage, and makes a wheeling motion; by and by being conglobated and mixed with ſome part of the Cloud, it is carried Head-long, and being repulſed and beaten back by the Earth carries what ever it meets with its whirling motion, aloft into the Air; it is the chief Plague of Mariners, as *Pliny* ſaies in *Lib.* 2. *Nat. Hiſt. Cap.* 48. bowing and breaking, not only their maſts but the very Ships themſelves.

Preſter, But if the ſaid Exhalation be of an hotter Nature, and by *Antiperiſtaſis* or Motion be ſet on Fire, and carry the Flame along with it, 'tis called *Preſter* from burning. *Seneca* calls it the Fiery whirl-wind, *Queſt. Nat. Lib.* 5. *C.* 13. This doth not only overthrow, but burn al that doth ſtand in its way: and herein only it differs from a Thunder-

a Thunder-bolt, in that it hath more Wind, and leſs Flame; but in a Thunderbolt there is more Flame and leſs wind. *And ſo much for Winds.*

Chap. 4. *Of the Earth-Quake.*

Ariſtotle relates the differing opinion of Authors touching the Earth-Quake, (which the Greeks term *Seiſmos*,) in his 1 *B. of Meteors Cap.* 7. Seneca *Lib.* 6. *Queſt. Nat. from Chap.* 5. to 21. Plutarch *in his* 3. *de Placit. Philoſoph. c.* 15. Pliny *B.* 2. *Nat. Hiſt. c.* 79. Gellius *B.* 2. *ch.* 28. from whence we may ſee how careful the Ancients were in ſearching out the Cauſe, why that which is the only immoveable and fixed thing in the world, which ſubſtains us and all things on it ſelf, upon which Cities are built, which ſome have called the foundation of the World, doth ſomtimes reel and ſtumble. We, deſirous to obſerve Brevity, omitting the examination of other Opinions, ſhall only lay open the Truth.

Seeing the Earth is of it ſelf immoveable, nor can be moved by any thing which Externally goes about the ſame, as winds or waters, (againſt the Motions and moſt Vehement Tempeſts whereof the Earth hath formerly ſtood and doth ſtill ſtand immoveable:) 'tis to be thought, that it is moved in Earth-quakes from ſomwhat within it ſelf. Now in the Caverns of the Earth are included Waters and two kinds of Exhalations. Now although that *Gellius* tels us, *Lib.* 2. *Cap.* 8. that the moſt Ancient Greeks were of Opinion, that the Earth was moved by the Floods and Violent Motions of Waters abounding in the Caverns of the Earth; (and therefore they call *Neptune* the Earth-ſhaker:) yet waters being not very apt to move, nor diſpoſed to moſt ſwift and violent Motions cannot be accounted the Cauſe of Earth-quakes. Which is alſo confirmed by what *Scaliger* relates in his 38 *Exercitation.* There is ſaies he in the Weſterne part of the Iſland of *Hiſpaniola* a Mountain of huge Height, which hath many hollow Caves within it, whereinto Rivers are tumbled down with ſo great a noiſe and roaring of the waters that they are heard five Miles of, yet no Earth-quake is cauſed thereby. And the like Judgment we are to make of moiſt Vapors.

Waters are not the Cauſe of Earth-quakes.

The Cauſe therefore of an Earth-quake muſt needs be hot and drie Exhalations. For hot and dry Spirits are fitting to raiſe Motions moſt ſwift, Violent and Vehement, which is alſo apparent from Thunder, Thunder-bolts, Winds, Whirle-winds, Storms, and Guns: and every hot thing doth of its own Nature tend upwards. Alſo there are other Tokens hereof. For Hiſtories bear witneſs, that for the moſt part, after an Earth-quakes a great abundance of winds and ſpirits have broken forth, and have caſt Stones, Aſhes, and other Obvious things out of the Caverns of the Earth; yea and the moſt Earth-quakes have not ceaſed till thoſe winds included have made an Eruption: which *Ariſtotle* tels us did happen about *Heraclea* of *Pontus*, and the Iſland *Hiera*, *in the* 2 *of his Meteors*, *Chap.* 8. Moreover, moſt Earth-quakes happen, when the Sea is Calme and the Air free from winds; *viz.* When all the matter of Winds is contained in the Caverns of the Earth. You may finde more ſigns in *Ariſtotle*, in the Place foreal-ledged.

The true Cauſe.

Now ſome hold, that theſe Spirits are either bred in the Caverns of the Earth by the Heat of the Sun and of the underground Fire; or that being bred without, they enter in; or that they are driven thither by the *Antiperiſtaſis* of the cold Air; or that when two contrary Winds do blow at once, the one being vanquiſhed by the other doth paſs into the Caverns of the Earth which it meets with; or to avoid Vacuity, when the waters go out, the Exhalations inſinuate themſelves into the hollow parts of the Earth. But the firſt amongſt theſe Cauſes is either the chief or only Cauſe. Now the Spirits which ſhake the Earth are contained in the profound Caverns thereof. For thoſe which are in the Cavities next the Surface of the Earth, ſeeing they can eaſily finde an Egreſs, do not move the Earth. Now theſe Blaſts are moved, becauſe they have no place in the Caverns of the Earth fit and large enough, or becauſe they are preſſed by the Waters which flow to and from the Sea; or becauſe they are ſhut up by the *Antiperiſtaſis* of cold, and gathering force, and their heat being Augmented, they are Attenuated and Rarified; which alſo may be performed by the *Subterranean* or Under-ground Fires.

Proſi

From the Premiſes therefore it appears, that an Earth-quake is cauſed, when hot and drie ſpirits are Præternaturally ſhut up in the Caverns of the Earth, and ſeek their way out. For, not finding the ſame they move this way and that way, and by their great force and violence they ſhake the Earth. Now the ſundry manners and various faſhions of Earth-quakes proceed from the greater or leſs Quantity of Exhalations; from the divers figures of the Caverns; from the longneſs or ſhortneſs of their diſtance from the Earth; from the ſundry manners of the Exhalations breaking forth; which the Author of the Book *de Mundo Cap.* 4. and others do reckon up. Yet all of them may be referred to two, whereof one may be called *Tremor* a trembling; which is cauſed, when much Spirit is ſpread out Long-waies and Broad-waies: the other *Pulſus* a beating or thruſting, when the Exhalation is diſpoſed rather long-waies. For it ſeeking Egreſs lifts up the Earth much after the ſame manner as the Arterie is lift up in the Diaſtole or widening of the pulſe.

Two manners of motion of the Earth.

From what hath been hitherto ſaid, it appears, that the whole Earth cannot be ſhaken at once. For the Spirits ſhut up in the Caverns of the Earth have no proportion (to ſpeak of) to the whole Globe thereof, nor have ſo much ſtrength in them. And therefore, if there be any univerſall motions of the Earth, they ought to be referred rather to the infinite power of God, then to Natural Cauſes. With the Earth-quake is ioyned a noiſe, cauſed by the vehement Motion of the Spirits running to and fro in the Caverns of the Earth, and ſmiting againſt the ſides of the Earth; which noiſe ſomtimes goes before the Earth-quake, and is a ſign thereof ſuddenly to follow; ſomtimes it accompanies the ſame, and it is various, according to the Quality of the matter receiving, and the form of the *Cavities*, or paſſages through which it goes.

Univerſal Earth-quakes are not natural.

The duration of an Earth-quake is not one and the ſame alwaies, but divers, according as the Earth doth more or leſs reſiſt, or gives an eaſie or difficult paſſage to the winds; or as the Spirits themſelves are plentiful or ſcanty. For few Spirits are ſooner diſcuſſed and ſooner get away, but ſtore of Spirits abide longer; alſo when there is a wide paſſage for them to go out, they go out apace; but when the paſſage is ſhut up or is very narrow, they get out more ſlowly and continue their Buſtling longer. So *Seneca* in *Nat. Queſt. Lib.* 6. *Cap.* 30. Relates that *Campania trembled continually for divers daies together.* And *Livy* in *Decad.* 4. *Lib.* 4. Writes thus: In the beginning of the year, when *L. Cornelius*, and *Q. Minutius* were Conſuls, there were ſo many reports of Earth-quakes, that Men were weary not only of the thing it ſelf, but of the many Solemn daies appointed becauſe of the ſaid Earth-quakes. And the ſame Author in his 4 *Decad. Lib.* 5. tels us, there was an Earth-quake for forty daies together; yea and *Ariſtotle in Lib.* 2. *Meteor: Cap.* 8. and *Pliny* in the 2. *of Nat. Hiſt. Chap.* 8. tels us that Earth-quakes have ſomtimes laſted a year or two years together, and that they have returned at certain Times and Seaſons.

How long the Earth-quake laſts.

The Effects truly of Earth-quakes are wonderfull and horrible. For many times, (as *Seneca in* Lib. 6. *Nat. Quæſt. Cap.* 1. Speaks,) *it doth not only ſwallow up ſingle Houſes, Families or Cities, but it overthrows whole Nations and Regions, and ſomtimes overwhelms them with Ruins, other-whiles covers them in a deep Gulf, not ſo much as leaving any appearance of them: ſo that the Earth is ſpread over moſt Noble Cities, not leaving any marke of their former Exiſtence*: which happens when by impulſe of the Spirit the Caverns of the Earth are ſhaken and fall in. And ſomtimes indeed, the Cities and Houſes are not ſwallowed up in the *Cavities* of the Earth, but the Earth raiſed up in a tumor, they fal down flat. Hiſtories are full of ſuch calamitous accidents. In the Reign of *Tiberius Cæſar* 12. Cities of *Aſia* were in one Night overthrown with an Earth-quake, as *Pliny* relates in the 2. *B. of his Nat. Hiſt. Cap.* 84. He alſo relates that in Crete a Mountaine was broken by an Earth-quake, *Book.* 7. *Cap.* 16. *Theodoretus* tells us *in the* 2. *Book of his Eccleſiaſt. Hiſt. ch.* 25. how the greateſt part of *Nicæa* was overthrown. Of the overwhelming of *Helice* and *Buri* *Seneca* writes in *Hiſt. Nat Book* 6. *Ch.* 23. 26. 32. And *Ovid in the* 15. *B. of his Metamorphoſis.*

The wonderful effects of Earth-Quakes.

Many times alſo in the Sea a Gulf hath been opened, and the waters ſwallowed up, as Rivers on the Land, ſo that the Fiſhes and Ships have ſtood on dry ground. Contrarywiſe, many times the Earth ſwelling on high hath not ſetled again, producing Mountains on the maine Land, and Iſlands in the Sea: whereupon alſo ſomtimes the Sea hath been

been raised aloft like a Mountaine, and hath afterwards fell in upon the Neighbouring Lands. Such an Earth-quake *Socrates* speaks of *in the* 2. *Book of his Ecclesiastical History, Chap.* 3. For the same Cause the Courses of Rivers have been somtimes changed by Earth-quakes, *viz.* a Tumor or swelling of ground being raised up in the middest of the former Channel. Somtimes new Rivers have broken forth, the ways being opened through which the underground Waters are carryed. Somtimes Fire and Ashes are cast out by an Earth-quake: somtimes a Venemous Spirit is belched forth, which proves baneful to Man and Beast. *Seneca* tells in *B.* 6. *Nat. Quest. ch.* 27. of a Flock containing Six hundred Sheep, all kil'd by an Earth-quake. Many other mischiefs also an Earth-quake brings with it, all which were contained in that one Earth-quake which happened under *Theodosius*, which is described by *Euagrius* in the 1 *B. of his Ecclesiastick Hist. Chap.* 17.

And we may wel believe, that Earth-quakes bring not only present mischiefs, and that the danger is not alwaies in the motion, but that there is as great or greater foretold by Earth-quakes; and *Pliny* saies wel, *Lib.* 2. *Nat. Hist. cap.* 84. that *Rome* was never shaken with an Earth-quake, but it was the sign of some Event to follow. And very many Histories Testifie, that the same hath happened in other places.

And therefore look what the Romans did of old, who when they felt an Earth-quake, or heard tidings thereof, they made Proclamation that the people should keep Solemn daies for that Cause, as *Gellius* tells us, *B.* 2. *chap.* 28. much more should we, when such Calamities are present or impendent, cal upon God by Prayer. For that which the Romans feared, (as the same *Gellius* records, *in the same place,*) viz. lest by naming of one god instead of another, they should engage the People in a false Religion, and therefore they durst not in their Edict, as was the usual manner, Name or appoint to what god the People should sacrifice; that have we no need to fear, to whom that God is known, who being angry, the Earth trembles and the Foundations of the Hils are shaken, 2 *Kings. ch.* 22. ver. 8.

Chap. 5. *Of the Clouds.*

WE have Hitherto explained those Meteors which are bred of an Hot and Dry Exhalation; we come now to those which are bred of a vapor in the middlemost and lowest Regions of the Air. In the middlemost Region are ingendred Clouds, Raine, Snow and Hail.

How a Cloud is ingendred.

A Cloud is engendred when vapors being raised aloft, either by heat which they have received from the Sun, or other heating causes, or by hot Exhalations mixt with them, are assembled in the middle Region of the Air, so that they cannot be penetrated by the sight. For a Cloud is nothing else but a vapor raised up in the middle Region of the Air, and there compacted; which appears hereby, in that in the lower Region of the Air, when vapors and Exhalations are raised out of things which boil or burn, they represent Clouds; and because they that walking beneath see Clouds upon Mountains, when they ascend to the tops of the said Mountains, they walk through the Clouds as through Mists; and because as soon as the said Exhalations are condensed they remain no longer Clouds, but turn into Rain.

What a Cloud is.

The height of the Clouds.

Touching the Height of Clouds, Authors are at variance. Some conceive that the Clouds are not above three miles distant from us; yea and that some of them are not above half a mile high. Others write that no Cloud is above nine miles distant from the Earth. *Vitellio* is of opinion, that the vapors ascend 52000, paces, or 13. German miles. *Cardan* in his *book de Subtil. Lib.* 4. *p.* 205. reprehends *Vitellio*, and avers that the highest which vapors mount is 772000. paces, or 193. German miles. Howbeit, 'tis like enough, that the height of the Clouds is not alwaies the same, but various, according to the variety of the matter, places and times: Yea, and we often see with our Eyes, that at the same time and in the same Region, one Cloud is higher then another, and that one goes above another. I my self have seen two clouds carried with contrary motions: and one moving above the other, towards the East; the other moved under the other, toward the West. Also experience shews that clouds are not so high, as some imagin. For the tops of some Mountains reach above the clouds. For the Mountains *Olympus* and *Athos* are so high that Ashes left upon their tops all the year long have neither been blown away by Winds, nor washed away with Rain. And such as have stood on the top of *Vesuvius* have observed that some clouds were just as high as the Mountaine, and some much

much lower. To which that agrees which *Zabarella* writes in his 8. *Chap. de Regionib. Aeris.* I went saith he, to the top of *Venus Mount*, which is the highest in the Territory of *Padua*, and there I found the Air clear all day long; but beneath, about the middle of the Mountain, I saw the Clouds, which hindred me from seeing the Valleys: and in the Evening being come down from the said Mountain, I found that there had been a great Rain that day, below, whereas it Rained not at all on the Mountains top. *Francisc. Piccolhomineus* de Meteor. C. 11. saies the same, how that Men living upon high Mountains, or Travailing thereupon, do see the Rains below them in the Valleys; whereas they themselves are in clear weather; and he saies the same happened to himself travelling over the Alpes and the Apennine Hills. And any man may observe the same in Mountanous places.

The Colors of Clouds. The Colors of Clouds are various, according to the various disposition of the matter receiving the Beams of the Stars, and especially of the Sun, which *Pontanus* thus describes.

Hexameter verses.

The white Cloud's not very thick, and mixt with a thinspred Vapor,
Through which the Sun with his raies doth break to the inside.
The black Cloud is ful of a thick dark Smoak and a Vapor,
Not at all to be pierced through, by the Beams of the Sun-shine.
In a Purple Cloud's much heat; and Good Store of Humor
In the blew colord Cloud is hid, which lustily Raineth.

Chap. 6. *Concerning Rain.*

SOme Clouds are termed barren, which are white and Transparent, and do rather by agitation of the Winds turn into Air then showers: others fruitful, which being moister then the former, are fit to engender Rain. For Rain is nothing but a Cloud, Cooled, Condensed, and turned to Water. And Rain is bred, when the vapors which make a Cloud are yet more condensed, and turned into Water; which being heavier then the Air fals down of its own accord in drops. For Rain is made after the same manner as hot vapors upon the walls of Baths, or in the Winter in hot stoves, upon Globes of Glass, Iron or Tin jugs that are cold, are turned as we see into Watry drops.

What Rain is and how 'tis bred?

Diversity of Rains. Now there is some diversity of Rains, proceeding from the variety of the Clouds, and of their place, which is somtimes higher and somtimes lower. For when the Cloud is High, Unequal, Spungy and Barren, and few smal drops fal like Dew, they are called *Pscades* heat-drops. But if the Cloud be more near and compact, and the drops fal down thicker, 'tis called *Imber* a shower. Finally, if the Cloud be yet thicker and suddenly condensed by a greater cold, and greater drops fall more thickly, 'tis called *Nimbus* a strong shower. Yea and somtimes whole Clouds are so condensed by a sudden cold, that the waters descend not drop by drop, but come down in streams, and destroy Towns and Cities; and then they say a Lump of a Cloud is fallen down.

Pscudes. *Imber.* *Nimbus.* *The Lump of a Cloud.*

Prodigious Rains. Also there are *Prodigious Showers* so called, such as we read of every where in Histories, *Tit. Livius* relates in *Decad.* 3. *B.* 7. that it Rained Milk, as doth *Pliny* also in *B.* 2. *Nat. Hist. C.* 56. and *Livy* tels us that it Rained Blood, *Decad.* 3. *B.* 4. *Decad.* 4. *B.* 10. and *Pliny* in the place forecited. Also that it Rained Flesh *Livy* tels us in *Decad.* 3. *B.* 3. and *Pliny* in the foresaid place. That it Rained Stones in many places *Livy* relates, *Dec.* 1. *B.* 7. *Dec.* 3. *B.* 1. 234. 6. 9. 10. *Dec.* 4. *B.* 5. 68. *Dec.* 5. *B.* 1, 2, 3. That it Rained Earth the same *Livy* informs us, *Dec.* 4. *B.* 4. 57. *Dec* 5. *B.* 5. *Pliny*, in the *forecited place* writes, that it hath somtimes Rained Iron, Wooll, and Bricks. Authors tel us that Fishes have somtimes fallen down in Showers of Rain: and those Frogs and worms which are seen after Rain are by some thought to have fallen down with the said Rain. Yea and some relate out of *Avicenna* that once on a time a Calf fel out of the Sky.

Their Causes. Most of these Prodigious Rains are to be ascribed to Superior Causes, *viz.* To God warning Men of Evils to come; and to the Devil, indeavoring by such Prodigies to draw men into Errors and Superstitions: yet some of them may also be

referred to Natural Cauſes. True Bood and Milk cannot Naturally deſcend in ſhowers; ſince they are bred only in living Creatures. Yet nothing hinders but ſomwhat like them may fall down, *viz.* When by the Sun-beams a vapor is drawn out of a red or white Earth, or is aloft ſo digeſted, that it may ſhew ſuch a color, and being afterwards reſolved into Rain may reſemble Milk or Blood. And that ſmal Stones may be made by a great heat of ſtore of dry Exhalations in the Air, is a matter ſounding like Truth.

As for thoſe kind of living Creatures which may otherwiſe be bred of Putrefaction, ſuch as Frogs, were muſt hold, that either they are ingendred of ſome matter in the Earth moiſtened with ſhowers (which ſeems to many men moſt probable) or that they lie hid in the chinks and Caverns of the Earth, and by the falling of the Rain are called out as it were and ſo leap forth. But incredible it is that more perfect Animals which are generated only of Seed, and great Stones ſhould be bred in the Air: but likely it is they have been caught up by whirlwinds in one place, and thrown down in another. Now there are certain ſigns of Rain as of other Tempeſts, which would be too long to reckon up in this place, and long Catalogues of the ſame are ſet down by others. But the principal may be ſeen in *Plimes* 8. *Book Nat. Hiſt. C.* 55. And in *Virgils* 1 *Book of Husbandry.*

Chap. 7. *Of Snow and Hail.*

How ſnow is bred?

OF the ſame matter with Rain is Snow alſo made. For Snow is bred of a Vapor raiſed to the middle Region of the Air or ſomwhat lower, or of a thin cloud before it is turned into Water and Rain, congealed by vehement Cold, and torne into parts or flakes, which deſcend like ſoft Wooll, ſomtimes greater, other whiles leſſer, according to the vehemency of the Cold. Now Snow is bred in the Winter time chiefly, becauſe the cold is then ſtrong and vehement, ſo that it is able not only to condenſe vapors into clouds and Rain, but alſo into Ice. For Snow as *Seneca* ſaies, *Queſt. Nat. Lib.* 4. *cap.* 3. is nothing but a kind of Ice bred in the Air.

The color of Snow why white.

Now Snow is white, becauſe 'tis ingendred of a Spungy tranſparent cloud. And that which is tranſparent, after it is terminated, doth next of all become white, becauſe that color is moſt of kin to tranſparency. This appears in Chryſtal or Tranſparent Glaſs, and clear Ice; whoſe ſurface if a man render uneven, ſo that it is no longer tranſparent, or break and grinde it into ſmal parts, in room of tranſparency whiteneſs is produced. It happens ſomtimes, that, when the lower Region of the Air is a little hotter then ordinary, the Snow as it fals down doth melt when it comes there; and ſo, that which is Snow above, is Rain below. And therefore frequently when it Rains in Valleys, it Snows upon the high Mountains. And for the ſame cauſe on the higheſt Mountains, when there is no Snow to be ſeen on the Plain ground, there hath been Snow lying, even in the middle of the Summer. Touching the good which Snow doth to fruits and Trees, read *Pliny* his 2. *chap. of the* 17. *Book of his Natural Hiſtory.*

Hail what it is, and how and where Generated.

Beſides Rain and Snow, of Clouds alſo there is bred Hail. For *Hail* is nothing but congealed Rain; and it is bred, when a Cloud is diſſolved into Rain and deſcends, and in its coming down by extremity of cold 'tis congealed into little round Balls. Now Hail is congealed, not only in the middleſt, but alſo in the loweſt Region of the Air. Which may hence be gathered, becauſe ſomtimes Chaf is found congealed in Hail-ſtones, which Chaf as it was coming down the cold alſo intercepted, and ſhut up in the congealed Water. If the cold be remiſs a certain imperfect and ſoft kind of Hail is bred, of a middle Nature betwixt true Hail and Snow, which they term *Granula*, and reſembles ſmal Sugar-Plums, and this fals chiefly about the End of Winter. Before the falling of Hail, for the moſt part great and terrible ſounds are heard in the Air, which are cauſed by the great conteſt of Heat and Cold in the Clouds. Hairs, and Chaf, and other things which are ſomtimes encloſed in Hail-ſtones, have been carried aloft by the Winds, and congealed together by the Cold.

manytimes there are ſtrange figures in Hail.

And whereas ſomtimes ſtrange Figures are ſaid to be ſeen in Hail, it is partly to be aſcribed to the Fancies of Men, who looking intently upon the Snow, do conceive there

therein Sundry Images, as they do in the Clouds; and partly to the divine Power, which may imprint certain resemblances in the Snow, whereby men may be admonished of some faults in their life and Conversation.

Chap. 8. *Of a Mist, Dew, Hoare Frost,* Honey *and Manna.*

ALso of a Vapor some Meteors are Generated, in the lower Region of the Air, which must also be mustered. And to begin with a Mist, the Author of the Book *de Mundo*, in his fourth Chapter thus describes it: *A Mist is a certain dewy exspiration, not apt to turn to Water, thicker then the Air, more spungy then a cloud. 'Tis bred either of the beginnings of a cloud being rarified, or of the Reliques of a cloud.* In which words he determins that a mist is a certain vapor, thicker then the Air, thinner then a cloud, hovering over the Earth, bred of an Exhalation growing thin, which should otherwise have been the matter of a cloud; or of the thinner parts of a cloud, unfit to ingender Rain, and remaining after it. And therefore a Mist is a token of Fair weather to follow. There is also another Mist, which consists of thicker vapors, exhaling out of the Earth, which also by Reason of their thickness, and the smal heat in them, cannot be carried aloft, but settles in the lowest part of the Air; and so they cause a darkness; and if by the heat of the rising Sun they be discussed and extenuated, they intimate fair weather; but if they be drawn up all together into the Air, being there congealed by the coldness thereof they become matter of Rain.

what a Mist is?

The Dew where and how ingendred.

Now Dew is made of a smal Quantity of a thin vapor, which because of the weakness of the heat reaches no further then the lowest Region of the Air, and indeed below the upper part thereof, and being by the cold of a temperate night turned into smal drops of Water, it sticks to Plants and other things. For the dew is chiefly found on the Leaves and Flowers of Plants, especially where they are smooth and thick; and sometimes also in other parts of them, as also upon Stones. For though it fals alike upon all places below; yet either by reason of their frequent pores, and roughness, or by their heat, it is drunk up and dissipated. On high Mountains there is no Dew bred; and sometimes also it rises not above two cubits, and only the grass is moistned thereby, but things a little higher remain dry. Dew therefore differs from Rain, only in the paucity of the matter, the place where it is bred, and the weaker heat whereby it is congealed. Now Dew is Generated chiefly in the Spring and Fall: but in the Heat of Summer and Cold of Winter it is not bred. For the Heat consumes the matter; and the cold suffers not the Vapors to be raised. Also it is not Generated, but when the Sky is calme and clear; because when the Sky is troubled and agitated with winds the vapor is dispelled, and cannot be congealed into Dew. Likewise Dew never fals but in the morning and Evening. For in the day time it is consumed by the Suns heat, and degenerates into a very thin and light Spirit, so that if an Eg-shell be filled with Dew, and the hole stopped with Wax, or other Glew, and it be then exposed to the Sun, the Eg-shell will mount aloft; the Dew being changed into a most thin vapor and spirit, which ascends upwards, and carries the Eg-shell with it. The Chymists teach, that Dew contains in it the most subtile part of Nitre and Volatile Salt, which is contained in the surface of the Earth, and therefore it is used to make Extracts.

The Nature of dew explaind by the Chymists.

Hore Frost doth not very much differ from Dew; for Hore Frost is bred, when a thin Vapor in a smal Quantity is lift up from the Earth, and cannot rise high, but by the vehement cold of the night it is congealed, before it turns to water. Therefore, look what Snow is in the middle Region of the Aire, that is Hore Frost in the lowest Region; and what is Rain above, is Dew below.

Hore-frost how ingendred.

what honey is, and how it is bred?

Also Honey is to reckoned as a kind of Dew, touching the generation whereof, this is the common Opinion: that with the Vapors which are drawn up in the day time out of Waters and Moist places, for the most part, Hot, Fat, and subtile Exhalations are lifted up, not only out of the Earth and Water, but also out of Plants and other things, which being throughly mixed with Earthy Watery and aery parts, and concocted by the heat of the Sun in the day time, and then by the moderate cold of the Night condensed, they stick upon Plants like Dew. And

that

that Honey is nothing else but a juyce, consisting of Exhalations and vapors, mingled and digested in the Air, by the Heat of the day, and congealed by the nights Cold, and so descending in the manner of Dew.

Which opinion as it is not quite to be rejected: so it seems not satisfactory of it self. For if the Dew be easily elsewhere dissipated and discussed by the morning beams of the Sun: How comes it that Manna and Honey are not also dissipated. Also manna and Honey differ not a little from Dew; nor hath Dew of it self any Fat or Clammy parts. And therefore this also seems fit to be added: that out of Plants a certain juyce and Native Vapor doth distil or breath out, which nevertheless is dissipated by the day-heat of the Sun: but it is at night mingled with the falling Dew, which hinders it from being dissipated, and grows with it into one Nature. From whence 'tis easie to shew a Cause, why there is more Honey gathered at this or that time of year, in this or that constitution of the Air.

And therefore though all Honey is sweet of it self; yet sometimes both its Taste and Smel is changed, according to the Nature of the Plant from which it is gathered: and therefore it is sometimes Venemous, when it is gathered from venemous Plants. Whereof see *Pliny Lib.* 21. *Nat. Hist. Cap.* 13. *Dioscorid. B.* 2. *Cap.* 74. *and Book* 6. *Cap* 8.

This same Honey is twofold, Manna called also Air-Honey, or Dew-Honey, and which in a special manner is called Honey. For Manna is a Honey or Dewy Humor, mixt of a vapor and the Subtile and Fat Exhalations of Plants. and by the temperate coldness of a clear night congealed; sticking upon Plants, Stones and other things near the Ground; which at first is more liquid, and afterward the thinner parts resolved it becomes harder, and having attained its consistency, it is coagulated into certain grains. For although some hold, and among them *Christophorus a Vega Lib.* 2. *de Art. Med. Sect.* 3. *cap.* 11. That Manna is the work of certain smal bees resembling large Gnats, from which Bees sitting in swarms upon the Trees the Manna drops down like sweat: yet most likely it is, that these smal Creatures are rather drawn thither by the sweetness of the Manna, then that they make the same. There is much bred in the East, because of the purity of the Air and a certain moderation of heat and cold in those parts. 'Tis not bred in cold places: there is little bred in *Italy*, save in *Calabria*, from whence it is carried as a commodity into other parts. *Two sorts of honey.*

Now whether that Manna wherewith the Israelites were fed fourty years in the Wilderness, was the same with this of ours, Authors vary. *Vallesius* in his *B. de Sacra Philosoph. chap.* 57. and other later writers hold it was the same kind of thing. Many things said of that Manna of the *Hebrews*, *Exod.* 16. *Numb.* 11. do also agree to this of ours: yet herein *that* disagrees from ours, because thereof, (beaten or ground.) Cakes or Cracknels were made. For our Manna is not of such an hardness. But however herein all agree, that many things which hapned touching the *Hebrews* Manna cannot be attributed to Natural Causes, but only to the infinite power of the most good and great God. *Whether our manna be the same which the Israelites had.*

But vulgar Honey differs little from Manna, and the matter of both is one and the same, save that the matter of Manna is thicker, more compact and Earthy; but that of Honey more subtile and more digested. For Honey is a certain Dew, gathered by Bees, and receiving alteration from the little bladders they have within them, and afterwards stored up by them in little cells in manner of a pure Liquor, wherein afterwards it works like new Wine; and is by its Natural heat concocted, and grows thick, as *Aristotle* relates in his 5. *de Histor. Animal. Cap.* 22. and *Pliny* in *Nat. Hist. L.* 1. *Cap.* 13. *Common honey what it is, how differing from manna, & how generated.*

Honey is chiefly gathered by Bees both wild and domestick: Yea and Drones also and other insects, being much of the Nature of Bees, do gather Honey, out of all Herbs which have hollow flowers like Cups, and out of others wherein there is any sweetness: which is done without any detriment to the flowers. You have more of the Nature of Bees and Honey in the same place of *Aristotle*, and in *Plinies B.* 21. *Nat. Hist.* from *chap.* 5. to the 16.

Chap. 9. *Of the Rain-bow, False Suns and Moons, strakes in the Sky, and Circles about the Moon.*

AFter Clouds and such things as are of them ingendred, there remain to be handled certain things appearing in them, called *Phantasmata*, apparitions; such as are the Rain-bow, the Halo or bright Circle, and other like Images. And to begin with the *Iris* or Rain-bow, which they say hath its Name *ab Eirein* to tel, because it foretels Rain or Fair weather, (and therefore it is by Poets termed *Junos* Messenger,) It is a bow of three colors, in a Dewy cloud, caused by the beams of the Sun or Moon opposite to the said Cloud, and therein retract and reflexed.

What the Rain-bow is?

And that it may be better understood what the Nature of a Rain-bow is, all the members of the definition must be weighed. The subject of a Rain-bow is a dewy vapor, or a Dewy Cloud, which is beginning to be resolved into drops or Rain; but it is not yet Rain, only it is condensed into little drops like dew or the Water which a man blows abroad out of his mouth half shut. For a continued Cloud is not the subject of a Rain-bow; but those parts thereof which do no longer hang together, but being by the cold straitened and condensed are every where distant one from another, divided into very many smal drops, which are like little Looking-Glasses, and are of a middle Nature betwixt a perfect Rain and a Cloud.

The subject of the Rain bow.

Now that the Rain-bow cannot be made in any continued vapor, but that it may be generated in many little round Bodies, is demonstrated from the rules of Opticks concerning the Nature of reflection. We shall only here produce what experience teaches. Let a man stand with the hind part of his Head to the Sun, and with his mouth or other Instrument let him throw water into the beams of the Sun, so that the Water may lose its continuity, and be resolved into very many very smal drops: which being performed, a Rain-bow as it were will appear in those little drops, which represent the rorid Vapor. The same may be observed when the Water is scattered by Oares, or falling violently upon a stone it is scattered into the Sun-beams. And though the rorid Cloud, which is the subject of a Rain-bow, is no longer continued; yet to us it appears continued, by Reason of the Vicinity of the parts, and its overgreat distance from us.

The efficient cause of a Rain bow

The efficient Cause of a Rain-bow, are the beams of the Sun and Moon, broken and reflected in these drops. And that reflexion is altogether necessary to the making of a Rain-bow, hence appears; because both the incident Raies and the refract do go into the part opposite to the lightsome Body, nor do they pass on to the part seen by the lightsome Body; nor to the sight, which is averse from the lightsome Body in such as behold the Rain-bow, can they come, unless they be reflected. Therefore in the same manner, as we see in looking-Glasses the Images of things behind us, even so the raies of the Sun or Moon are reflected in those little looking-Glasses.

Howbeit, 'Tis necessary that there be also refraction. For when as a Ray of the Sun or Moon comes to the first drop of the Vapor, it pierces the same being through nearness of the Sun not yet much condensed, yet so as that it is refracted. From thence going to another hindermore drop, which is thick enough, it is presently reflected, if no other drop of a rorid vapor stand before the same: but if any such drop stand in the way, the beam is first refracted, and afterwards so refracted it is reflected to our sight. Also many Raies are refracted in many obvious drops; and whiles they fall in, and pierce through divers thinner drops to one thicker, in which they are reflected; then by such a like drop they are again reflected. For every Ray, as wel the incident as the reflect, is twice refract in such a drop. First, Towards a perpendicular line, when it enters the drop; because it fals out of the thinner Air into a thicker Rorid Vapor: afterward, 'tis disjoyned from the perpendicular, when it goes again out of a thick drop into the thin Air.

The Rain-bow therefore is bred, when some rorid Cloud is in making, and begins to be resolved into very many smal drops, and to be condensed into Water:

Which

Which drops are yet nevertheleſs more thin, and not quite turned into Water, ſo as to fall down. For if the Sun or Moone ſhine juſt oppoſite thereupon, the lucid beams being variouſly refracted in theſe drops, and reflected to our ſight in form of a Pyramid, their light being confuſed and mixt with the Heat and ſhadow of the drops, they preſent unto our ſight a coloured Bow.

A Sun & a Moon Rain bow.

Now moſt Rain-bows are cauſed by the Sun, few by the Moon. And therefore *Ariſtotle* tells us, that in the ſpace of fifty years there were but two Moone Rain-bows ſeen. For to the making of a Moon Rain-bow, beſides a fitting vapour, 'tis requiſite that the Moon be in the full; otherwiſe its beams are too weak; alſo that it be near the Horizon: al which do ſeldom fall out. In the Year 1599 foregoing, at Mid Summer, after great Thunder, Lightning, Thunder-Bolts and Rain in the Night, betwixt the North and Eaſt we ſaw a remarkable Rain-bow, which might compare with ſome Sun-Rain-bows, in the Brightneſs and Beauty of its Colours. Now why only the Sun and Moon make Rain-Bows, the Reaſon is, becauſe the beams of theſe Stars only can reach Croſs the Horizon to the Clouds, and be from thence reflected; thoſe of the Sun becauſe they are moſt ſtrong; thoſe of the Moon becauſe they are near at hand. But the Beams of the other Stars are either too weak or too far off. Or if they be ſo ſtrong as to be able to reach croſs the Diameter of the world to the Clouds: yet are they not ſo ſtrong as to be reflected to our ſight. For reflect Lights are weaker then thoſe that ſhoot their Beams directly, according to the Rules of Opticks.

why the Rain bow is made only by the Sun and Moon.

Now why only the Colours and not the Image of the Sun or Moon appears in theſe Looking-glaſſes, there is a Threefold Cauſe. Firſt, becauſe the Cloud is not a continued Body, but reſolved into very little drops or Optick Glaſſes. For in ſo ſmal Glaſſes the Images alſo are very ſmall, which being afterwards reflected are ſo weak, as that they appear not diſtinct, but confuſed. Againe, the Raies are of themſelves weakned before they come from the Luminous Body to the ſight. Finally add hereto the blackneſs of the Cloud. For the rorid vapour, becauſe it begins to be reſolved into water, aſſumes a certain blackneſs and Watry Colour, which being mingled with the Light, makes that the Image of the Sun or Moon cannot diſtinctly appear, but rather a Colour.

why only colors and not the image it ſelf of the Sun and Moon appear.

Now the diverſity of Colours in the Rain-bow ſprings from hence, becauſe ſome raies enter more deeply into the dewy Vapour, and are reflected by the remoter droplets, others are reflected from meaner vapours and reſting in the ſurface of the Cloud, by which are made divers reflexive pyramides, having baſes equally diſtant. Now the Colours are three, red which is the upmoſt, or outmoſt, and is bred of the greater ſplendor, and the raies of that reflexive pyramid, whoſe baſis is of all others neareſt our ſight: and therefore its Raies are alſo ſtrongeſt. Now becauſe the Light is bright ſhining, and the Water blackiſh, the Colour appears neither white nor black, but a reddiſh Colour betwixt both. The next Colour is a Leek-green; which is the middlemoſt in the Rain bow, this is cauſed by the Raies reflected from a more deep part of the vapour; and therefore it inclines more to blackneſs. For the Raies alſo themſelves are weaker, becauſe reflected from a place more remote; and that vapour becauſe it is farther from the Sun, is more compact, and comes nearer to the Nature of Water then the former. Hitherto alſo the ſhadows do very much contribute, which are ſhed from the former droplets or ſmal glaſſes upon the hindermore, with which the raies reflected from the hindemore are mingled. Of which we have an example in the colours that are in the necks of Doves, ariſing from the Sun-beams. For theſe colours are bred from the ſhadows that being ſent from the Feathers are mingled with the Suns light. The third is the Purple, which is the internal, and ariſes from the Raies reflected from a place yet more remote; and for the ſame reaſons why the Second is blacker then the Firſt, the Third is blacker then the Second.

The Colors of the Rain bow.

And although there may be more then theſe three Colours in a Rain bow; yet becauſe for the ſaid Reaſons the Blackneſs is more and more increaſed, after the third no Colour can be perceived: and not only the reflected Raies are ſo weak that they cannot reach to our ſight; but the Light alſo is ſo darkned by the Blackneſs of many ſhadows, that it is hardly diſcernable by the ſight. Now the fourth Colour which they call yellow, and is ſeen betwixt the firſt and ſecond, is no new Colour, but ariſes from the Neighbourhood of thoſe two. Now the

Lunary

The Moon Rain bow whiter then that of the Sun.

Lunary Rain-bow is whiter then the Solar: becauſe the Light it ſelf of the Moon is paler then that of the Sun; again, becauſe the ſhadows which are by the fore-more drops caſt upon the hinder more are not ſo obſcure and dark, as thoſe caſt by the Light of the Sun. For the ſhadow of a ſtronger Light is blacker, and contrariwiſe. Add alſo hereto the darkneſs of the night. For that which is of its own Nature Blackiſh, if it be ſet by a more black thing, it appears whiter.

But why the Circumference only of a Circle appears and not the whole and entire Body thereof, the cauſe is: foraſmuch as that part only of any irradiated Body is ſeen, from which the Raies are reflected to the ſame centre of ſight, according to equal Angles, and of a radiated cloud nothing is ſeen but what is carried by Raies collected in the ſame point of the Axis wherein the ſight is. But theſe do only make a bow, as the Teachers of Opticks do at large demonſtrate.

why the Rain bow never makes a perfect Circle.

Now why the Rain-bow never makes a perfect Circle, but either a Semi-circle, or an Arch leſs then a Semi-circle; and that it is a Semi-circle when the Luminary is in the Horizon, but an Arch leſs then a Semi-circle, when the luminary is above the Horizon; & that the Arch is ſo much the wider, by how much the Luminary is nearer the Horizon; and ſo much the leſſer by how much it is nearer the Meridian; the reaſon thereof is, becauſe the Centre of the lucid Body, of the ſight, and of the Rain-bow, are alwaies in one and the ſame right line. And therefore the Centre of the Luminous Body being placed in the Horizon, in the oppoſite part of the Horizon will be the Centre of the Rain-bow, and ſo there wil be a Semi-circle above the Horizon. But when the Sun is elevated above the Horizon; the Centre of the Rain-bow is on the other ſide depreſſed; and therefore that Segment of the Circle which is beneath the Horizon is greater becauſe it contains the Centre, and that above is leſs. For we ſee only thoſe things which are above the Horizon. And by how much leſs of the Diameter of the Rain-bow is above the Horizon, ſo much the greater is the Circumference of the Circle; and a Semi circle is half of the leſſer Circle of any Arch whatever that is greater, which proceeds from the Refraction of the beams: becauſe about the Sun-riſe the Air and vapors are thicker, which afterwards by the directer beams of the Sun are attenuated. And therefore the Rain-bow which is ſeen through a thicker Medium, appears alſo larger. But I paſs over theſe and other things which might be ſaid of Rain-bows, ſeeing they cannot be rightly explained without optical demonſtrations and many Diagrams, which muſt be here for brevities ſake omitted. They may be ſeen in *Ariſtotles* 3. *de Meteor Ch.* 4, 5. the writings of optical Authors, and in the learned Treatiſe of *Johannes Fleiſcherus, de Iridibus*, wherein he comprehends the Doctrine of *Ariſtotle* and *Vitellio* concerning Rain-bows, and augments the ſame with neceſſary demonſtrations.

Falſ Suns.

Of kin to Rain-bows are the falſe Suns, or other Suns placed by the true Sun. Now the *Parelios* or falſe Sun, is the Image of the Sun, received in a Cloud continued, compact, equal, ready to turn to Water, in its forepart Tranſparent and Poliſhed as it were; in its hinder part dark and terminated, and placed obliquely by the Suns ſide, and reflected thence to our ſight. For look as if a man ſhould ſet a Looking-Glaſs ſlanting by the ſide of any thing, he will twice ſee the Image of the thing: ſo if a Smooth cloud like a Looking-Glaſs be ſet aſſant beſide the Sun, there will appear divers Suns. But *Pliny* writes that to his time there had never been ſeen more then three at once, *Hiſt. Nat. B.* 2. *Ch.* 31. Howbeit they report that ſix were ſeen at *Papia*, before the War. Now theſe falſe Suns ſeldom appear, becauſe there is ſeldom found a cloud that hath ſuch a diſpoſition and ſuch a Poſture to the Sun.

The Paraſelene or falſ Moon.

After the ſame manner is cauſed the Paraſelene or falſe Moon, which herein only differs from a Parelios, that the former is an Image of the Sun, this latter of the Moon. Now the Images of theſe two Stars only are reflected to us; becauſe their Raies are the ſtrongeſt. Yea and a falſe Moon never appears but when the Moon is in the ful, when her Light is moſt plentiful and ſtrong.

Rods, and ſtrakes in the Sky.

Hither alſo are to be referred the *Virgæ* or Rods ſo called, which are as it were certain lines and long Pillars, which appear of divers colors, in an uneven cloud, placed on one ſide of the Sun, ariſing from the beams thereof refracted. For ſuch ſtraks are ingendred, when an uneven cloud, which hath ſome parts thicker and as it were of a wateriſh Nature, and others thinner, is placed beſide the Sun. For when the Sun-beams fall thereinto, they cannot pierce equally becauſe of the diverſity of

the

the parts; nor do they appear contiguous, but rather disjoyned, and in the hinder parts, through which they penetrate, refracted; and so they represent divers colors: after the same manner as the Sun-Beams coming through chinks into a close Chamber, they represent lightsome Lines. Now the colors are not the same, but various according to the divers disposition of the parts wherein the Raies are received, which in thinner parts appear more light and white, in thicker more black and dark. Now these Rods or Strakes do appear for the most part, when the Sun rises or when he sets, but never at Noon tide; for then his Beams are so strong, that they easily attenuate and pierce into thickest Vapors.

Finally, There is seen in the Clouds the *Halo*, which is by the Author of the Book *de Mundo* thus defined, *Cap. 4. Halo* is a shining Circle, under the Sun, Moon, or other clear Star, appearing just betwixt us and the Star, made by the Beams thereof there refracted. For this same Circle is made when the stronger beams of some Star fal into a cloud equally spungy, which in regard of the Spunginess can indeed pass through, yet are refracted therein because of the thickness of the Air, and being refracted to even Angles they make a Crown. Now in the Center of the Crown the Star appears which is the cause thereof; because the straight Raies are stronger, and do more attenuate, Rarifie, and Illuminate the cloud. Now this kind of Crown appears most commonly a nights. But the vehement heat of the Sun dissipates the Vapor, and makes it more rare, so as it is unfit to refract the Sun-beams, by which means such a colored circle might arise. Now the Sky must be calm, that the *Halo* may be seen. For a cloud moved and variously agitated can neither retain an equal disposition of parts, nor present a certain color by the refracted Raies.

Halo the Circle about the Sun, Moon &c.

Chap. 10. *Of Fountains.*

But that we may at last finish our Doctrine of Meteors, let us speak somwhat in the last place of Fountains and of the Sea. The opinion of *Aristotle* is commonly known touching the original of Fountains: how that Air and Exhalations in the Caverns of the Earth do by the coldness of the place lose their heat, grow thick, and are turned into water: after the same manner as in the middle Region of the Air, of vapors condensed, Rain is ingendred; which afterwards descending, and from many places gathered into one, and there flowing out become a Fountain: whose continual running is maintained by new Air daily succeeding in the Room of the former to avoid Vacuity, and afterwards changed into Water.

Aristotle his opinion of the original of Fountains.

But in good deed if we understand this Opinion of his concerning all Rivers, it is not true. For though we should grant that some Water may be made of Vapors condensed in the Caverns of the Earth, and that this may haply give beginning to some Fountains: yet we cannot be brought to think, that so much Water is this way generated, as to supply all the Fountains and Rivers that run upon the Earth. For since it is apparent, how great a Quantity of Air is required to make a little Water, and how much space those vapors take up of which a little Rain is bred; where will there be so many and so large Caverns, wherein so many Vapors, and so much Air, can be collected for the production of so many and so great Rivers? Also a reason of the perpetual Course of Rivers can hardly be rendred according to this opinion; seeing there is not alwaies the same plenty of Vapors. Much less can a Reason be given why many Fountains Issue from the tops of the highest Mountains.

Let us therefore rather embrace that opinion which is the most ancient of all, which the Preacher in *Eccles.* 1. *v.* 7. comprehends in these words: *All Rivers run into the Sea, and the Sea Flowes not over; the Rivers return to the places from whence they came, that they may flow again*; And let us hold with very many most learned men, that Fountains and Rivers as they run into the Sea, so have they their Original from thence. For otherwise the continual running of Rivers cannot be made forth, nor a cause be given, why the Sea receiving perpetually so many Rivers runs not over: or how Fountains come to arise from the tops of highest Mountains. And unless

The true opinion.

Why the Sea flows not over.

unless the Rivers had their Original from the Sea, it could not be but the Sea must run over. For the Rivers have some proportion to the Bulk of the Sea, seeing some of them are poured with such violence and in so great plenty into the Sea, that for the space of many miles together they afford in the Continent sweet Waters to the Mariners, amidst the Sea Waters. Nor can the Sun or Winds consume so much thereof as doth flow in; but the Sea repairs its detriment which it receives in common with the Rivers from the Sun and Wind, out of the Air, in the Nights. Also many Fountains have many things common with the Sea. *Pliny* writes in *Nat. Hist. Book* 2. *Ch.* 103. of Jupiters Fountain in *Dodona*, that it was alwaies dry at Noon; and from thence the Water encreased, till at Mid-night it overflowed, and after that it deceased by little and little. And he relates *in the same place*, How that overagainst the River *Timavus* there was a smal Island in the Sea, with hot Fountains in it which Ebd and flowed as the Sea. Nor doth *Plato* seem to have been averse to this Opinion, who in his Dialogue called *Phædo* writes, that there is an hollow place in the Earth, into which all Rivers run, and out of which they run back again.

Why Fountains arise from the tops of highest Hills?

Hence also a cause may easily be rendred, why Fountains arise on the highest tops of Mountains. For since the Globe of the Earth is round, and the store and weight of the Sea Water is great: it may easily by its weight thrust the water which flows through the veins of the Earth into the highest Mountains. And whereas the Fountain waters are not Salt, though the Sea is Salt, and that they have great diversity in qualities, springs from hence; because the Sea Water being strained through many turnings and Veins in the Earth, loses its saltness, and receives other qualities out of the Caverns of the Earth through which it runs and flows. Now the difference of Fountains is great; for some are used instead of drink, and others for Physick. The former are more simple, the latter more compound.

Mineral waters what?

Metalline or Mineral Waters are those, which have in them the spirits or smallest particles of Minerals, Metals, and Subterranean Juyces, and differ from other ordinary potable Waters, in Smel, Tast, Color, and therefore are not used for drink, but only as Physick. Now these Waters are of two kinds; some have in them the very Bodies of Minerals and Mineral Juyces, such as are Salt Waters, vitriolated Waters, Alum Waters, out of which the water being boiled away, Salt, Vitriol, and Alum are drawn; nor may they conveniently be used as baths. But some contain in them the Spirits of Metals, and therefore in regard of the very great active and penetrating Faculty which they have, they are Medicinally used, both to drink and to Bathe in; such are the hot Baths, the acid and brackish Waters.

They are twofold.

whence metalline waters have their virtue.

Now whence these Waters have their faculties, Authors are not agreed. Some conceive they have their Virtue from the Minerals and Metals through which they flow. But this is not likely to be true. For since the Bodies of Metals are so compact, the Water which flows over them cannot so easily draw in their Forces; and if Mineral and Metalline Waters did thus gain their Virtues, we should have more of them. This indeed is true, that Minerals, as Vitriol, Alum, and such like, are corporeally mixed with the Water; and therefore they are separated from the Waters by boyling: Howbeit those Waters wherewith the Minerals are mixed only Bodily, do not gain those Virtues which the true Mineral Waters have, out of which the Metalline Bodies cannot be separated. But Metals cannot communicate their Faculties to Waters, only by the Waters running over them.

And Experience doth witness that many springs breaking out of high Hills do bring out with them Gold, Silver, Copper, Iron, Tin, Lead, *Lapis Lazuli*, the Armenian Stone; and yet they have no faculty of any of those Metals which they carry and drive forth, but may be drunk as ordinary Waters.

Moreover if those Waters should gain their Virtues only by washing the Metals in their Course; the Virtues of the next Veins through which they flow had been long since exhausted: whereas nevertheless these Waters have had the same Virtues for many Ages together, and do still retain the same. Moreover out of those metalline Waters no Metals can be drawn forth, either by distillation, boyling or any other way.

Most

Moſt likely therefore it is, that thoſe waters take their Virtues from the firſt matter of the Metals, which is a ſubtile, Fluid, and ſpirituous ſubſtance, not yet compacted nor coagulated into a ſolid Metalline Body. For theſe ſpirits of the Metals are mixed with the waters, and communicate all their Virtues to them. For as out of Vitriol, Sulphur, Yea and Metals themſelves, by force of Fire ſpirits are drawn, which being mingled with water do communicate their Virtues thereunto: even ſo Nature alſo, in that great Circulatory the Earth, in the generation of Metals produces ſpirits, which being mixed with neighbouring Waters and ſuch as run by, do beſtow their Virtues upon them.

The Cauſe of the heat of Baths.

Nor doth a leſs difficulty occurre in ſearching the Cauſe of hot Baths. Some attribute the Cauſe to the Suns heat, others to winds gathering hot Exhalations into one place: but without any probability. Others think they have their heat from the *Lapis Calcarius* or Chalk Stone ſo called. But neither is this probable. For the *Lapis Calcarius* doth not heat water unleſs it be firſt reduced into Lime by Fire. And ſuppoſe that thoſe Stones were Calcined by the Fire under ground, yet could not that heat be perpetually continued. For after that the Lime-ſtone is once ſoaked in Water, it will afterward no more become hot.

Others therefore do more probably deduce the cauſe of the heat of Baths from the Fire which is in the Bowels of the Earth, and that the Waters do either run through thoſe hot places underground, or that in the way they are joyned to the Fire and flame, or that they run ſo long near or over the Chanels of Fire, as to grow hot thereby; or whiles the Earth is made hot by ſubterranean Fires, many Vapors are from thence lift up, which at laſt in ſome wide place turn to water, and ſome where or other ſeek their way out. Which they declare by this example. Let ſalt water be mixed with Potters Clay, and make a round Globe of the ſaid Clay, hollow within, whereinto put a Pipe, and ſtop the hole with Clay whereinto the Pipe is put; then put the Globe upon the Fire, with the Pipe from the Fire. When the Globe Waxes hot, hot Salt Water will flow out of the Globe through the Pipe.

Howbeit, ſome there are, who though they allow this manner of generation in many places; Yet ſeeing in all places where there are hot Baths there are not ſigns of any Subterranean Fire; and moreover there are Baths found, whoſe heat vaniſhes away, if you dig a little to find their original: wherefore they conceive it probable, that ſome hot Baths are cauſed by two or more metalline Waters, which are cold to the touch, of their own Nature, but upon their meeting together they grow hot by the Repugnancy of Spirits. An example whereof is ſeen in ſpirits of Vitriol and Oyl or Salt of Tartar; alſo in *Aqua fortis* and Tartar, Butter of Antimony and Spirit of Nitre: which though to the touch they are cold: yet if they are mixed they grow hot; and that in ſuch a meaſure, as if ſuddenly you pour Oyl of Tartar upon *Aqua fortis* wherein Iron hath been diſſolved, it will not only boyl but take flame: which alſo will happen, if you ſuddenly pour a quantity of ſpirit of Nitre upon Butter of Antimony ſo called. And therefore they conceive it rational, that when two ſprings conſiſting of a mixture of ſuch Repugnant ſpirits do meet and mix together, that the water ſhould by that means wax hot.

The Cauſe of the Seas Saltneſs.

Now concerning the Sea, Authors are wont in the Doctrine of Meteors to handle two queſtions principally, one concerning the Saltneſs of the Sea, another touching its Ebbing and flowing. Touching the Seas ſaltneſs the opinions of the Ancients were many, which *Ariſtotle* refutes in his 2. *Meteor. Cap.* 3. We in this point follow *Ariſtotle*, and hold that the Sea water is not Salt of its own Nature, but that it becomes ſuch by the admixture of ſome Salt thing; which alſo is ſeen in Ley. Which alſo may be gathered from that which *Ariſtotle* in the *forecited place*, and *Pliny* in *Nat. Hiſt. Lib.* 31. *Cap.* 6. deliver, how that hollow balls of Wax let down by Nets into the Sea, and empty veſſels ſtopped, they gather into themſelves freſh Water. For many Earthy Salt Exhalations do both fal into the Sea in ſhowers, and flow thereinto with Rivers: alſo the Sun exhals out of the Sea the moiſter and ſweeter parts of the Water, leaving behind the more heavy and Earthy. And therefore on the top the Sea is ſalter, then towards the bottom, becauſe the Sun doth more exhale the ſweet parts out of the Surface: alſo the Sea is ſalter in the Summer then in the Winter, and more in the Eaſtern and Southern parts then elſewhere; becauſe in thoſe places the Sun beams are ſtronger.

The Ebbing and flowing of the Sea how caused?

As to the Ebbing and flowing of the Sea, there is very great difficulty, chiefly caused by the very great variety which is in the said Motion. For in some places there is no such motion, or it is scarce discernable: in other places it is so great, that vast shores lie bare, and there are places to go over dry, which were before covered with Water: in some places the motion is slow, in other places so quick, that in the space of an hour or two many miles will be covered with the Flood, and as many bared by the Ebb, so that men can hardly run fast enough to save themselves from the fury of the Tide coming in. Nor doth this motion keep the same time in all places. For the most part, it flows six hours and Ebbs as many. Yet in some places is flows seven hours and Ebbs five: in others, it flows four hours and Ebbs eight. In which Variety nevertheless there is this regularity, that the Ebbing and flowing together last but twelve hours. In very many places the greatest floods are at full moon; yet in some places they happen at new Moon. Touching which variety of this Motion, you may read in *Cardan, Lib.* 2. *Subtil. p.* 168 *Scaliger* in *Exercit.* 52. *Caspar Contarenus* in *Lib.* 2. *de Elementis. Collegium Conimbric. de Met. Tr.* 8. *Cap.* 4.

Now touching the Cause of this motion there are so many several opinions, that you can hardly tel which to assent unto. Wherefore not without Cause *J. C. Scaliger* in his 52. *Exercit.* thus writes: *My common saying which I use every where, That we know nothing, is most seasonable in this disquisition touching the Motion of the Sea.* And a little after. *Who will not say that Philosophy her self can but stutter in this point? When he shall see almost in the same shoars, that it is high-water at* Calicut *when the Moon is full, and at the shoars of the River* Indus, *when the Moon is new. This is a point of subtilty which thou oughtest to have searcht into, O* Cardan; *which if thou canst unfold unto us, I will consent that thou be counted the god of Philosophers. You will ask me, what say you to the matter? I? I did nothing but expect to hear from you. But seeing you appear not in this Point, I dare not so much as expect my self.* And therfore if so great a Philosopher doth here confess his own Ignorance, what can we promise after him save to reckon up the opinions of some Authors.

Julius Cæsar Scaliger therefore attributes the force hereof to the Moon, and divides half the Heaven which is turned about in twelve hours, into two Quadrants, and that during the one the Waters do follow the Moon to the middle of Heaven six hours, and as many more they fall back, being driven by the repulse of the shoars. But whether the encrease of the Sea be caused by rarefaction, or by addition of new substance, he dares not determine; only he saies, the Sea Waters do follow the Moon, and that they are suspended thereby as the Iron by the Loadstone. And herein most Authors are agreed, that the Motion of the Seas Ebb and flow depends upon the Moon, and that it is terminated in twelve hours. And that because the Moon doth not alwaies rise in the same place, nor is also alwaies at the same time carried above the Horizon, therefore the Ebbing and flowing doth not observe the same time. Now that this motion depends on the Moon, besides what hath been said, this seems also to be a sign, *viz.* That the Flood comes every day an hour later; because the Moon returns to the same place in about the space of twenty five hours. Now *Scaliger* in the same place endeavors to render a Reason of that variety, of swiftness, and Cessation in some places, and of other things seen in this Motion; from the various Scituation of places, the highness and lowness of the shoars, the greatness and narrowness of the Sea, the even Plainness of its Course, or the many turnings, windings and straits, and the Nature and depth of the bottom.

Contarenus conceives, that when the Sea flows the waters are rarified and so swel and are on all sides poured out to the shores; and that in the Ebb the Waters are condensed and contracted into themselves and so leave the shoars; and that the rarefaction proceeds from Heat, the force of which heat depends upon the Moon. And to explain the time of this motion, he divides the Heaven into four equal parts, with the two greatest Circles, the Meridian and right Horizon, upon which when the Moon ascends towards the Meridian, the water swels and is poured abroad; for then the beams of the Moon have greatest force: but when the Moon is moved from the Meridian to the occidental Horizon, the water flows back again, and gathers it self into it self, because of the weakness of the Raies of the Moon. But why,

when

when the Moon is moved from the Occidental part of the Horizon, unto that part of the Meridian which is beneath the Horizon, the Water should swel again, and afterwards decrease when the Moon goes from the Subterranean Meridian to the oriental Horizon, he saies he can find no probable cause himself, nor can see any made out by others. Also he professes the Cause is to him unknown, why in some places there is no Ebbing or flowing of the Sea.

Taurellus holds thus: The Sea disburthening it self into the inmost parts of the Earth, is the cause that the Waters with great violence flow from all the shoars round about to that Gulph or inlet. For there where the Sea empties its Waters into the Cavities of the Earth, there also it is depressed and fals, that the other Waters may from all parts creep thither, which (the Caverns of the Earth being filled) being gathered from all sides into one place, according to the Largness of the Sea and the force of the Waters it is raised aloft, and afterward settles by degrees, and returns to the shoars formerly forsaken, an addition also of Waters being made from the Rivers. Thus the whole bosome of the Sea is filled with Waters, til the upper Cavities of the Earth being emptied they require more Water of the Sea, to swallow up after the foresaid manner.

THE FIFTH BOOK.

Of Minerals and Metalls.

Chap. 1. *Of Earths:*

After Meteors, we are next to discourse of Bodies perfectly mixed. Now Bodies perfectly mixed are of two sorts: some lifeless, others living. The lifeless are Metals. For by that word all things bred in and digd out of the Earth are understood, as appears by the preface of *Dioscorides* to his Fift Book. Late Writers call them in general Minerals: because the Quarries and Pits whence they are digd are termed Mines.

whence Minerals have their forms?

Now concerning the Nature of all these kind of things, this is first to be known; that many men conceive, that these Minerals and Metals contain nothing in them besides Elements, and that they are only simply mixt bodies; but herein they are mistaken. For their operations are of a far other Nature, then that they can be deduced from the Elements alone. And therefore *Scaliger* saies rightly in his *Exercitation* 137. *Sect.* 20. That *every forme of a perfectly mixt Body, although it is no Soul, (as for example that of an Adamant) is a fift Nature far different from the four Elements.* And in his *Exercitat.* 101. *Sect.* 14. he reprehends *Cardan* for beleeving, that only by the mixture of the Elements it can come to pass that the Load-stone can draw Iron. For even these things have also, that I may so speak, their Seminary forms and Virtues, put into them by God at their first Creation; nor were they made after the Creation of the world, by the various conflict of the Elements, but were created by God; and by those forms they are perpetua-

red,

ted; and from those forms proceeds not only the forming of their Bodies, (which is no less admirable then in some plants,) and their wonderful Virtues, but also their Propagation and Perpetuation. For the form of Minerals and Metals can multiply it self; and those Bodies have in their Creation a power given them by God to multiply themselves in a fitting matter and a convenient place. Which even Nitre doth teach us. For though out of Nitrous Earth the Salt be once extracted by boiling: yet out of the Mother of Nitre, as they call it, new Nitre is generated; and that not once only, but very often; which our Salt-peter men now a daies know very well. Nor was it unknown to the Ancients, as appears from *Pliny*, *B.* 31. *Cap.* 10. where he writes, that the froth of Nitre was made, when the Dew had fallen, the Nitre Mines being Pregnant, but having not as yet brought forth. By reason of which form it comes also to pass, that though in these Minerals there is a mutation in their external form, so that they are reduced into Pouders, or Liquors, or Glasses: yet they nevertheless eafily returne into a Metalline Body; because their internal form continues safe and sound, as may be seen in Mercury, Antimony, Lead and other things. And therefore when the Question is touching the Generation of Minerals and Metals; it is not enough to have recourse to those Vapors mentioned in the Doctrine of Meteors, but there is need of more determinate and Specifick principles.

Now what these are, cannot in general be wel explained. For there is great variety of Minerals, which must first be propounded. Now they are by others otherwise divided. I think fit in this place to retain the division of *Albertus Magnus*, who makes three kinds of them, Stones, Metalls, and Middle Natur'd Minerals; by which Name he comprehends all the rest, which have a certain middle Nature betwixt Stones and Metals.

And that we may begin with the last kind, it contains many things under it; Earths, Stones, Sulphurs, Bitumens, and some things mixt of these, coming nearer the Nature of Metals. As for what concerns *Earths*, we do not thereby understand the simple Element, nor yet that Earth which is every where plowed up by Husbandmen, and which is fit to sow Corn and to set Herbs in: which though it be not simple, yet it comes nearer to the Nature of the Element of Earth, then the Metalline Earths do. Although here also is great variety, and some ground partakes little or nothing, another partakes much of a Metalline Nature. Now that many grounds partake much of Minerals doth hereby appear, in that when they are burnt they send forth a Sulphureous Vapor, as Metals and Minerals are wont to do. But by earth in this place, we understand a Body digd out of the ground, which partakes of a Mineral Nature, and which (water being thrown on it) dissolves, and turns to Clay.

Potters Clay and Argilla. Among these kind of Earths the most vulgar is Argilla and Potters Clay; which is a Clammy Earth, and breaks not when it is molded, nor chops when it is dried. There is also great variety hereof, according to which the Vessels differ, which are made not only for Kitchin uses, but for other House occasions, and for the use of Gold-Smiths that melt Metals, and for Chymists. For of every kind of Clay all Vessels cannot be made, and one sort will endure the Fire better then another: also one sort wil be molded more delicate, thin and fine then another. Whence the excellency of Potters Clay is estimated.

Marga, Marle. After Argilla and the several sorts of Potters Claies comes *Marga* or *Marle*. Now this is a Fat Earth, being as it were the fatness of the ground, and the name comes from the High-Dutch, and 'tis called *Steinmarck*, as if you would say the Marrow of Stones; and it is found shut up amongst Stones. Now there are sundry kinds thereof; *Pliny* reckons six, White, Red, Dove coloured, Clayish, Stoney, and Gravelly. And of each of these there are again many different sorts. 'Tis found in many parts of Germany, and among them the *Marle* of *Rochlich* is most famous; which they use in the stead of Bole-Armeniack.

To Earths also belongs *Creta* Chalke, by which name also Earths are understood, which are used to Polish, Clense, Rub, Paint and Colour. There are many kinds thereof, yet because it is chiefly digd up in the Island of *Creta*, therefore all sorts have borrowed their Name from it.

There are also many other kinds of Earth, which are used partly by Physitians, partly by other Mechanical Artists, which differ in Rarity or Spunginess, in Clamminess,

mineſs, in colour, taſt and uſe. And as to their Medicinal uſe; ſome binde cool and dry, as the Eretrian, Samian, Lemnian, Armenian: ſome with their aſtriction have a certain biting quality, either from Nitre, as the Chian, Selinuſian, Cimolian, and *Pignitis*, which are Abſterſive or Scouring; or from Alum, as the Melian Earths, and the Clay of many Baths, which are good for the Gout and Malignant Ulcers: or they have in them ſome quantity of Bitumen and of Sulphur. Alſo there are ſome Earths which give a black Tincture fit to make Inke, as *Calcitis*, *Myſi*, *Sori*, and *Copperas*.

The moſt renowned among theſe Earths are *Terra Lemnia* and Bole-Armeniack. The former is ſo called from the Iſland wherein it is found. Alſo it is called *Terra Sigillata* or ſealed Earth, from the Seal imprinted thereupon. *Galen* avers that he ſaw with his own Eyes a certain hill near the City *Epheſtiades*, wherein no plant grows, the ſoil being as it were burnt up, of a red colour, out of which the Earth is digd. Alſo that there were three differences thereof: that one was of a red colour, but not ſtaining the hands, being the moſt excellent of all, which the Prieſt might only touch, as a ſacred thing; and he ſealed it with *Diana* her ſignet, which was the Picture of a Goat: the other was red Oker which did colour the hands of the touchers; the third was uſed to ſcour Cloathes, becauſe of its cleanſing faculty. Thoſe who at this day ſail to the Iſland of *Lemnos*, do ſay that it is gathered in the Dog-daies in a mooriſh ground, that it is ſigned with a certain Seal and ſent to the great Turk, and that therefore it is hard to come by, and not publickly ſold. But theſe ſealed Cakes have not all the markes of the old *Terra Lemnia*. Now the old *Terra Lemnia* had an excellent Faculty to reſiſt the Plague and Malignant Diſeaſes. *Terra Lemnia Sigillata.*

Bole-Armeniack or Earth of *Armenia* was brought out of that part of *Armenia* which is next to *Cappadocia*. It was of a pale colour, would quickly be reduced to fine powder like as Chalk will, being held in the Mouth it would melt like Butter: it was drying and binding; and therefore it was uſed for the *Dyſentery*, the looſneſs of the Belly, and ſpitting of Blood; for Catarrhes, and Ulcers of the Lungs: alſo it was good againſt the Plague. *Bole-Armeniack.*

Moreover there are many other Earths, *Eretria*, *Samia*, *Selinuſia*, *Chia*, *Cimolia*, *Pignites*, *Melia*, *Rubrica*, and *Sinopica*, Precious Earths ſo called moſt of them from the places where they were digged. Of which ſee *Pliny* Book 35. Ch. 16. and 17.

And indeed the Ancients uſed ſuch Earths as were then known to them, and were brought out of neighbouring places; and ſeeing we have hardly now any certain notice of many of them, and the Quarries of the Ancients by injuries of time and the change of Empires are either unknown or exhauſted, and every where in other places and in our Countries the like Earths are found: it is better to aſcribe the Virtues of theſe Earths to the kind then the place, and to value every one according to its own Nature, and to try the Vertues of Earths by Experiments.

For there is in *Hungaria Bolus Tockavienſis*, which *Crato* in his Epiſtles tels us that it will melt in the Mouth like Butter, and hath all the ſigns of true Bole-Armeniack, and is very good againſt Catarrhs; and he prefers it far before the Bole-Armeniack which we have at this day, yea before that which was brought the Emperor out of Turky. He ſaies he found by experience that it holp many of the Plague at *Vienna*. *Bolus Tockavienſis.*

Moreover there is the *Terra Sigillata* of *Sileſia*, which is preferred before the *Terra Lemnia* and the Turkiſh Earths which we have at this day. For it is now proved by many experiments, that it hath rare Virtues againſt the Plague, Malignant Feavers, the bitings of Venemous Beaſts, the looſneſs, and the Bloody flux. The Chymiſts call it *Axungia Solis*. The finder out thereof was *Johannes Montanus* a *Sileſian*, who publiſhed a Writing or Treatiſe concerning the ſame, how that Gold was changed by the ordination of God and Provident Nature into a moſt excellent prepared Medicine, eſpecially good againſt Poiſons, no leſs then thoſe Medicaments which are made with great Coſt of Hungarian Gold. And if that be true, I wonder why it is diſſoled rather with Spirit of Vitriol then Spirit of Salt. *Terra Sigillata of Sileſia.*

There is alſo found another about *Lignitium* and *Gold-berg* in *Sileſia*, which the Chymiſts

Chymists term *Axungia Lunæ*: and in many other places other such Earths are found. And therefore, as I said before, these kind of Earths are not so much to be esteemed according to the places, as their own peculiar Natures. And because they have all their Virtues from Minerals and Metals, when we would judg of the Virtues of any sort of Earth, we must consider with what Mineral or Metal it hath affinity. And now we proceed to other things of this kind.

Chap. 2. *Of Salts.*

AS concerning Salt, there are many kinds thereof. First, There is common Salt: which again is threefold: digd Salt, Sea-Salt, and that which is boiled out of Salt Fountains. Now what the original of Salt is, is not so manifest. 'Tis commonly said to be engendred of a watry and thick Earthy Juyce mingled together. But this doth not sufficiently explain the matter, nor is the cause rendred why it is found only in some certain places. The more probable opinion and most likely is, that Salt as other minerals and Metals, was at the beginning of the World created in the Earth, wherein it stil Preserves and Multiplies it self, by a faculty placed therein by the Creator. For if the simple Elements, in so many Mutations and Vicissitudes of Sublunary things, do preserve and multiply themselves, and so remaine entire, from the beginning of the world to this very day: I see no cause, why we should deny the same power to these Bodies. For that which was before said of Nitre, is true of common Salt. And therefore it is not bred in all places, but in those only where that spirit, (or Seminary principle, if I may so cal it,) is present; as Nitre is bred only in that Earth, in which there is the Mother of Salt-Peter. And from the principle of Salt, in the Caverns of the Earth, where there is no great store of moisture, *Sal Fossilis* or digd Salt is bred. And according as that matter which by the Principle and spirit of Salt is coagulated into a Body, is purer or impurer: so this digd Salt is bred purer or impurer, and some is blackish and dark colourd, othersome is white and transparent like Christal, which is called *Sal Gem.*

The Original of Salt

But if the said principle of Salt be mixed with much humidity and Waters sliding through the Caverns of the Earth; Salt Fountains, out of which Salt is boiled do thence arise. Some indeed conceive that Salt Fountains arise from the Sea. But the Sea Water doth not contain so much Salt in it as many Salt Fountains do; which experience doth teach Nor let any man say, that the Waters while they flow through the Caverns of the Earth do exhale, and are consumed by the underground Heat, and that so some Fountains come to be Salter then the Sea. For if this were so, the Salt Fountains which are farther from the Sea should contain more Salt in them then those that are nearer, which nevertheless agrees not with Experience. Others conceive that Salt Fountains proceed from waters which run through the Caverns of the Earth containing much digd-Salt in them. But, though this cannot be absolutely denied; yet the question is whence that ground Salt hath its Original and Durability. For if Fountains were made Salt only by their Waters flowing through ground-Salt, they would not last so many Ages; but the ground Salt being melted into the Waters would be consumed, but especially those Fountains would not alwaies afford a like quantity of Salt, seeing the Salt being melted by the running by of neighbouring Waters would be washed away. Therfore we must of necessity add the Spirit of Salt, the primary principle of the Generation of Salt.

Sea-Salt is made of the Sea water, the Heat of the Sun consuming the Watry moisture. And if the Heat of the Sun be not sufficient, it is perfected by Fire: and to make it whiter and purer, it is purged by Solution and Coagulation. There are also certain Lakes, which by the Heat of the Summers Sun, turn to Salt, whence we have the Tarentine and Phrygian Salt.

The use of Salt.

The chief use of Salt is to Season Meats, and all the Spice in the world will not make meat pleasant, without Salt. It Heats, Dries, Scours, and consumes superfluous moisture, and therefore preserves from putrefaction. And although it defends from Putrefaction, yet is it not good in putrid Feavers; not only because it is Hot, but because it dries too much.

Beside

Beſide Salt uſed in food, there is another ground-Salt, called *Armeniacus* or *Ammoniacus*, cal'd ſo from *Ammos* the Sand, becauſe it is found under the Sand congealed into plates, in the *Cyrenaick* Countrey. It was of a blackiſh color, and ill-taſted. And therefore it is now adaies out of uſe; and Sal Gem is uſed in ſtead thereof. But that Sal Armeniack which is commonly now ſo called, and which the Chymiſts uſe, is made by Art. It is made of five parts of Mans Urine and one part of common-Salt, and half a part of the Soot of Wood, boiled together til the moiſture be conſumed. That which remains is ſublimed, diſſolved again and coagulated. *Ammoniac Salt.*

This Salt is extreamly volatile, and renders all fixt things volatile, and therefore Chymiſts uſe it in the Solution and Sublimation of Metals. And in Plants and Animals, ſince there is found both a fixt and Volatile Salt, the Volatile is frequently by the Chymiſts called *Sal Armeniac.* Concerning Salt ſee *Pliny Lib.* 31. *Nat. Hiſt. Cap.* 7. and 9. and *Dioſcorides, Lib.* 5. *Cap.* 85.

Thirdly, Nitre alſo it ſelf belongs to the family of Salts, and it is bred in a peculiar kind of the Earth, upon Walls and Rocks, where it ſprouts out like white down, and therefore 'tis cal'd *Sal-Petræ Salt-Petre*, that is Salt of the Rock. Alſo they relate that it breeds of it ſelf in *Aſia*, for it drops down in Caves and is gathered and dried afterward in the Sun. The Lydian is the beſt, which is known to be true by its lightneſs and crumbling, and color almoſt Purple. This ſort is called *Aphronitrum*, as if you would ſay, the froth of Nitre. Alſo it was bred of its own accord in *Macedonia* among the Ancients, by the Coagulation of Water, and they cal'd it *Chalaſticum*, being white and pure, and the likeſt to Salt. By Art and boiling it is extracted out of the Nitrous Earths. Now this ſame Salt is of a wonderful Nature. For to ſight it appears white; to the touch cold: yet it contains in it a Spirit exceeding Red, Hot, and extreamly apt to take flame, and perfectly of a Fiery Nature. All the ſtrength of Gun-pouder proceeds from Nitre, only Brim-ſtone makes it ſpeedily take fire: yet becauſe all the Sulphur is not inflamed as it were in a moment, but ſucceſſively and by parts; but Nitre after it hath once taken Fire ſuddenly and forcibly burns all away, (and becauſe being ſet on Fire it cannot be contained in the Room wherein it was before; and beſides the Nitre and Sulphur are as it were Enemies:) hence comes that ſame thundering force of Gun-pouder. The Chymiſts take Nitre wel purified before and purifie it yet further, by caſting into it when it is melted over the Fire divers parcels of Sulphur; and this they call *Nitrum Præparatum* and *Sal Prunellæ*, becauſe it is of rare uſe in burning Feavers, eſpecially thoſe wherein the Tongue and Throat is inflamed, which inflamation is called *Prunella*. Concerning Nitre ſee *Pliny*, in *Hiſt. Nat. Book* 31. *Chap.* 10. *Nitre or Salt Petre.* *Sal Prunellæ.*

Fourthly, Of the Family of Salts is alſo Alum, called by the Greeks *Stupteria*, becauſe of its vehement aſtringency. For all ſorts of Alum do Heat, Bind, purge putrid Ulcers, dry up moiſture, quel proud fleſh, and therefore it is uſed in many Medicaments ordained for Ulcers. It is found in its mines, and is extracted by boiling. And where Alum is bred, there commonly is found Vitriol and Sulphur. And as it is boiled it contains much fattineſs in it, which cannot be ſeparated but by mans Urin, which being poured thereon, it makes it fall to the bottom. *Dioſcorides* reckons three kinds thereof; Digd-Alum, Round Alum, Liquid Alum. There are now more kinds known. The firſt is *Alumen Rupeum* or *Rochæ*, *Rock-Alum* or *Roche-Alum*; which Greek word *Rocha* ſerves the greateſt part of Europe to ſignifie a Rock, as *Scaliger* ſaith in *Exercit.* 104. *Sect.* 6. Alſo they call it Ice-Alum becauſe 'tis congealed in the form of Ice; and Roman Alum. This is moſt uſed in ſtead of the Natural ſorts, and is made in the Roman Territory, of a certain Stone burnt. *Scaliger, in the place forecited*, ſhews all the manner of the work. Then there is *Alumen Saccharinum*, made up like a Sugar-Loaf, of Roche Alum, the whites of Egs and Roſe-water, for Women to beautifie their Skins. *Alumen Squammoſum* or *Alumen Scajolæ* (for *Scaja* and *Scalia* ſignifie a Cruſt or Scale, *Scaliger Exercit.* 104. *Sect.* 7.) 'tis made of a Scaly Stone, tranſparent like Glaſs, which being burnt divides into plates, and grows white like Plaſter. Moreover there is a ſort of Alum made of Lees of Wine, burnt in the Fire. Alſo *Alumen Catinum*, made of the Aſhes of the Plant *Kali* or *Soda*. But theſe are rather Artificial and Compound Salts of Plants, ſuch as Chymiſts do at this day make, of all ſorts of Plants. *Alum.* *Kinds of Alum.*

Plants. To the kinds of Alum is referred also *Lapis Amiantos*, *Alumen Plumosum*, Fetherd-Alum; which nevertheless is not properly Alum, nor hath it the same faculties with other sorts of Alums. It grows in Mineral Quarries, Interwoven as it were amongst the stones; being so fixt that it will bear the Fire; whence some term it *Linum Vivum*. Concering Alum see *Pliny* in *Nat. Hist. Lib.* 35. *Chap* 11.

Vitriol Fiftly, Amongst the Salts there is *Vitriol* so called from its Glassie clearness, and by the Greeks *Chalcanthon*, by the Latins *Atramentarium* Blacking, because Skins and other things were therewith died black. This kind of Salt is of an admirable, and perfectly fiery Nature, and contains in it a burning Sulphur; and therfore it performs more then other Salts, in the dissolving, colouring and generating of Metals; and the spirit thereof changes Iron into Copper. Now it contains in it two spirits, the first white, of great and known use in Physick; the other red; and in the Earth at last remains the fixed Salt. Now Vitriol is either Natural, Congealed in the Caverns of the Earth, or dropping therefrom; or else Artificial, which is boiled out of certain Vitrolous Stones, or out of a rusty kind of Earth, or out of an Ash-colour'd Earth, speckled with green and red Spots, which nevertheless makes no difference in the essence of the thing: even as Salt digd out of the Earth, and that boiled out of Salt Fountains differ not essentially. Other differences are rather to be observed, whence also the difference of virtues depends. For although all Vitriol do partake of the Nature of Brass, and therefore vitriolated Water changes Iron into Copper, which is practised in *Hungaria* and at *Goslaria*: yet some partakes more of the Nature of Brass or Copper, and other of the Nature of Iron; and therefore some is of a Blew, other of a Green Colour, and that either a deep Green or a light Green. The Blew partakes of the Nature of Copper; the Green, of Iron. And that is best which is of a deep and pleasant colour, and transparent. The Cyprian, Roman and Hungarian are commended; nor is that a base sort which is found in some parts of *Silesia*. The best now adaies is made by Chymists out of Copper, of a delicate Azure colour: which they term *Vitriolum Veneris*. There is also white Vitriol so called. Now Vitriol heats and is astringent, consumes moisture, contracts the flesh, dries, and preserves moist flesh from corruption. The Ancients also gave it inwardly, to kill Worms and to resist the Poison of Toad-stools. But now, as was said, a spirit is drawn out of it, which is more safely given, and hath a rare faculty to dry and resist Putrefaction; and therefore it is profitably used in putrid Feavers and Pestilences. See of Vitriol, *Pliny Lib.* 34. *Nat. Hist. Cap.* 12.

Chap. 3. *Of Bitumen and Sulphur.*

THe Third kind of Subterraneal Bodies or Minerals we told you were Bitumen and Sulphur in their several sorts; *viz.* All such things as are Oyly and Fat, and are therefore easily mingled with Oyl; whether they be liquid or dry. And that somwhat may be said in general touching the original of them all; 'tis commonly held, that these kind of bodies are bred in the bowels of the Earth of an Hot and Dry Exhalation. But what was said before of Earths and Salts, the same must now be said of the sorts of Bitumen and Sulphure, and afterwards of Metals; that we deny not the mixture of the Elements in these things; but seeing there is no specifick Form of any Natural Body, which had not God for its author in the first Creation of the World, we must needs hold, that these things have not begun to be after the Creation of the world, by Reason of the Various concourse, Fight, and mixture of the Elements, but that they were made by almighty God at the beginning of the World, and that they received from the same Author this mixture which they have, with their Specifick Form, and a power to multiply themselves, and to change fitting matter into themselves. Whence it is, that though there are no where wanting Elements that may be mixed; yet cannot Bitumen and Sulphur be bred in all places, any more then Salts and Metals; but there only where the Specifick Form of Bitumen and Sulphur is found; which when new Bitumen and Sulphur is ingendred, is the principal Cause and Directrix of the mixture of the Elements. And therefore though we grant that such Bodies consist of Elements: yet we deny that they have their Forms from the Elements, but here also make use

The original of Bitumen and Sulphur.

Where Bitumen and Sulphur are generated.

of

of that passage of *Scaliger* formerly cited, out of *Exercitat.* 137. *Sect.* 20. that every form of every perfectly mixt Body, as of an Adamant, though it be no Soul, is a fift Nature, far differing from the Elements.

The matter of Sulphur, and bitumen.

And although we grant that the Matter of Bitumen and Sulphur are Elements: yet are they only the remote matter: but the immediate matter and whereof all sorts of Bitumen and Sulphur do partake, is a simple similary Body apt to take flame, and Fat, and which may in general be termed Bitumen and Sulphur, as you please: where with afterwards when the Salts concure, especially that of Nitre, Waters and other things, either Spirituous or Fluid, or Dry and Earthy Metallick Concretions, (the formative principle directing all to some certain form) thence are made sundry sorts of Bitumen and Sulphur. Now Bitumen and Sulphur are bred in the Earth, or in this Globe consisting of Earth and Water. For although some such thing sometimes falls out of the Aire: yet was it first drawn up in form of an Exhalation out of the Mines into the Air, where being coagulated it falls down again. Now when it is ingendred in the Earths Caverns it is voided forth either into the Sea, and is there cast ashore; or it flows out of the Earth, either alone or with Fountain Waters, or it is digged up. And there is scarce any Region in the World, wherein some sort of Bitumen and Sulphur is not found. Now aptitude to take flame is proper to al Bitumen, and after it hath once taken flame, to burn fiercely, and if Water be sparingly poured on, not to be extinguished but to burn more furiously. The Reason whereof is, because such Bituminous substances, after they conceive flame, do not only take flame on the top, as Wood and other things, but they do totally take fire and break into flame. Whence it comes to pass, that though the outer surface be wet with Water; yet the inner part which also flames receives not the wet, but rather gathering it self into it self it grows more strong, dissipates its Enemy Water, and flames more lustily. And hence also it comes to pass, that some mixtures of Bitumen do burn under the Water it self. And the burnings of certain Mountains, Territories and Waters, do proceed from Bitumen and Sulphur. Now all Bituminous Bodies have the Faculty and Hearing and Discussing; and therefore Fountains and Baths that have Bitumen and Sulphur in them are profitably used to dissipate cold Humors, in Palsies, Epilepsies, and such like Diseases.

Bitumen is apt to take flame.

The effects of Bitumen

And there is a great variety of such Bituminous Bodies. Yet they are all reduced to two kinds, whereof one is liquid, which flows like Oyl, the other coagulated and condensated. And again there are many sorts of both. The Liquid, which go all under the Name of *Asphaltum*, are *Naphtha*, *Petroleum*, Liquid Bitumen peculiarly so called, or Native liquid Pitch.

The difference of Bitumens.

And *Naphtha* in the first place is the liquid part of Babylonian Bitumen, being Hot, Dry, and of a Nature perfectly Spirituous and Fiery; which hath so much Affinity with Fire, that the flame will leap to it at a distance, and it may easily be set on Fire by the heat of the Sun. And therefore *Plutarch* in his *Alexander*, writes, that *Naphtha* was by some called *Medeas* Medicament with which she smeared the Crown and Vail of the Daughter of Creon, and so burnt her. What if *Hercules* coming to the Altar to sacrifice, with a Garment smeared with *Naptha*, his Garment caught flame, and so he was burnt; and this was the Blood of the Centaure *Nessus*, of whom the Poets Fable? Of whom *Ovid, Metamorph. L. 9. Fab.* 3.

Naphtha.

It is question'd amongst Authors, whether *Naphtha* should be called by the Name of Bitumen, or Sulphur, or Oyl. But seeing these Names are not alwaies used in the same manner, you shal not offend, whether you cal it an Oyl, *viz.* a Native Mineral Oyl, or a most delicate Bitumen. Indeed, it is a bituminous Spirit; and it seems to be to Bitumen as spirit of Wine is to Wine, and Spirit of Turpentine to Turpentine. The most pure and excellent kind of *Naphtha* is white: yet they report that there is also found a Yellowish, and also a black sort.

The Virtues of Naphtha.

By Reason of its extream aptness to take flame, 'tis hardly used about any thing: otherwise among all the sorts of Bitumens, it is most Hot, Dry, and piercing. And therefore it may be used as an Oyntment to discuss cold Humors, also for Cholicks sleepy Diseases, Apoplexies and Palsies. Concerning *Naphtha* see *Dioscorides, Lib.* 1. *Cap.* 85. and *Matthiolus* and others that have commented upon *Dioscorides.*

Petroleum. Next to *Naphtha* is *Petroleum*, as if you would say *Petræ Oleum*, Oyl of the Rock, because it distils out of Rocks, with a very strong smel. It is a Bituminous Oyl not so subtile, nor so spirituous as *Naphtha*; and therefore it neither takes flame at a distance, nor so suddenly. 'Tis of a various colour; the best is white; the worse Yellow, Red, Black. Hitherto belongs liquid *Succinum* and Liquid-Ambar, which are nothing but certain sorts of *Petroleum*. It is found in many Regions. In *Italy*, in the Country of *Mutinum*, it drops out of the Rocks, white and Red, of a very strong smel; in *Sicily* it swims upon their fountains, and they cal it *Oleum Siculum*, and use it for Lamps instead of the Oyl, and also *Pliny* commends it for Scabby Cattle. But it is found in very many places besides; nor must we esteem it from the place, but according to its Nature. It is al of an heating drying faculty; by reason of the thinness of its Essence it penetrates and discusses excrementitious Humors, and therefore it is good against the Palsie, and cold pains and Diseases of other parts, especially the Nervous parts.

Liquid Succinum & Liquid Ambar.

Liquid Bitumen. In the Third place is liquid Bitumen, so called by translation of the general term to one special sort; it is thicker then *Petroleum*, which they mingle with Tallow, to Smear the Axletrees of Coaches and Carts. If black Pitch be mingled therewith, it serves also to Pitch Ships and is called *Pissasphaltus*. Now these three, *Naphtha*, *Petroleum*, and *Bitumen Liquidum*, seem to differ, not in original, seeing they agree for the most part in one Root, but in the thinness of their parts; so that the thinnest and most spirituous is termed *Naphtha*; the middle and Oyly sort, *Petroleum*; and the thicker and more dreggy is called *Bitumen Liquidum* in a special manner. And the difference of these Bitumens may easily be observed in the distillation of Ambar: wherein, that which is thickest and remains at the bottom resembles the Pitchy Bitumen; the Oyl resembles the *Petroleum*; and the most subtile part resembles *Naphtha*, and like it doth also snatch the flame to it self.

Maltha. Finally, Amongst the Bitumens is *Maltha*, although it seems not to be meer Bitumen, but a Liquor thereof mixt with a Clayish slime; of which *Pliny Lib.* 2. *Nat. Hist. Ch.* 104. makes mention: in *Commagenes*, saith he, a City of *Samosate*, there is a Lake which sends forth burning slime or mud, which they cal *Maltha*. If it touch any solid thing, it sticks to it: Moreover, being touched, it follows them that go from it, &c. To smear and daub Walls, it serves instead of Chalk or Lime. *Vitruvius* tels us it was used to build the Walls of Babylon. *Lib.* 1. *Cap.* 5.

Halos anthos flows of Salt, or Sperma Ceti. Also there are many kinds of Concrete and Coagulated Bitumen. The first is *Halos anthos* the Cream of the Sea or of Salt, commonly called *Sperma Ceti*; it being as it were the Froathy Fatness of the Sea. It is no part of the substance of the Sea, but a certain matter that flows in from elsewhere, which may nevertheless contract somwhat from the Sea, especially saltness. Whether *Halos anthos* and *Sperma Ceti* be one and the same thing, is here no place largly to dispute. See the Commentators upon *Dioscorides* Book the 5. Ch. 88. Only this I must advise you of, that this Name is given a Medicine, now sufficiently known, from a false opinion, that it is the Sperme slipt out of the Womb of the Shee-Whale: whereas indeed and in truth it is a fatness of the Sea; and therefore some call it, not amiss, *Ambra alba* and *Succinum Marinum*, white Ambar and Sea-Ambar. The rare efficacy of *Sperma Ceti* in dissolving Clotted Blood is known to the common people: it is also profitably given to attenuate thick Humors in the breast, and it is good for such as have the Tissick.

Its use.

Ambar Greece. Moreover among these Bitumens is *Ambra Odorata*, *Ambra Grisea*, Ambar Greece [*that is Ambar gray, or gray Amber, for Greize and Greizely signifie gray, though now obsolete.*] Now the Name of Ambar is vulgarly used for all the kinds of Succinum. In a special manner the Arabians by this Name understand a certain most Odoriferous Medicament, which the Latines call *Ambarum* and *Ambracane*. *Hermolaus Barbarus* first cal'd it *Succinum Orientale*, Eastern *Succinum*. And although the question about the Nature and Original of Ambar greece is most intricate: yet their opinion is most probable and founded upon the most Reasons, who will have it to be a kind of Bitumen. For it is a certain fat substance, most Odoriferous, found in the Sea, especially in the Indian and Æthiopian Seas, or on the Sea shores, which is the best of all other, and most pretious; somtimes harder, other whiles softer, for the

the moſt part brittle, yet ſo that under the Teeth and Nailes it may be wrought and drawn out like Maſtick. The colour ſomtimes is uniforme, and hath otherwhiles yellowiſh or white ſpecks interſperſed. And although it be found in the Sea, yet is it not bred in the Sea, but is a kind of Bitumen or Oyl flowing out of its fountains, and being on the top of the Sea expoſed to the Air it is Condenſed and Coagulated like *Succinum* or white and yellow Amber. And the Hiſtories of the Indian Voyages do teſtifie that in ſome places of *India* a moſt noble Oyl or Balſam flows out of certaine Fountains. That ſame moſt grateful and pleaſing ſmel ſprings from a moſt noble kind of Sulphur. Yea, *Crato* writes that it is Sulphur, or that there is Sulphur in Ambar Greece. It hath a rare faculty to Roborate the Animal and Vital faculties: and therefore it is good for the Brain and Heart, and makes al the ſenſes more lively. 'Tis good for old Folks, and cold Natures; it is profitable againſt ſwounding fits and Melancholly. *The Virtues of Ambar Greece.*

After Ambar Greece, follow *Succinum*, yellow Ambar, which the Greeks call *Electron*, the Arabians *Carabe*, alſo *Ambra Citrina* yellow Ambar (in way of diſtinction from the foreſaid Ambar which is called *Gryſea* or *Chryſea*) alſo *Gagates* and *Vernix*. That is now beſt known which is found on the ſhoar of *Boruſſia* by the Mediterranean Sea, in ſhape of a Maſs or Clod without any form or Figure, hard and ſolid like a Stone, ſomtimes pure and ſincere, ſomtimes mixt with Herbs, Woods, little inſects, a certain black vitriol, and other filth. Hence ſome Lumps are tranſparent and clear, ſome dark: the color is alſo various; the ſmel pleaſing in its kind. Being rubbed with a cloath it draws to it dry Chaf and Straws, by its ſpirit going forth. Being put to the flame of a Candle it takes fire, flames and ſends out much ſooty Vapor. *Succinum or yellow Ambar.*

Touching its Nature and Generation there are ſundry opinions, whiles ſome hold it to be a vegetable, others a Mineral, others partly vegetable and partly Mineral; all which here to relate, (with the Reaſons which are brought to confirm each opinion,) and to examine the ſame, would be too tedious. We ſhal propound therefore only that opinion which is moſt likely to be true: *viz.* That *Succinum* or yellow Ambar is a kind of Bitumen. For it hath all the proprieties thereof, and it is got out of Mines in the Earth, in *Germany*, *France*, *Italy*, and it hath been found on the outſide Coagulated and abſolute Ambar; and within pure *Naphtha* or *Petroleum*. Alſo that *Melanteria*, *Chalcitis*, and other Minerals did grow to Ambar. Finally, By Chymical Art an Oyl is drawn out of it, agreeing with *Petroleum*. And this Bitumen, according as it is White, Yellow, or Red, Black, Pure or Impure, ſo the like *Succinum* or Ambar is bred thereof. Now it doth not conſiſt only of Bitumen, but alſo an Aluminous, Nitrous and Vitriolated ſpirit do concur; and therefore in many places where there is *Petroleum* no *Succinum* is bred, becauſe theſe ſpirits are wanting. Now, At firſt *Succinum* or Ambar is liquid, but afterwards when it is ſhed into the Waters, without any Exhalation of parts and evaporation, it is Coagulated and grows hard by means of a Nitrous, Aluminous, and Vitriolated ſpirit, the Saltneſs of the Sea alſo, Peradventure, Concurring. And that theſe are the immediate principles of Ambar or *Succinum*, Chymical reſolution it ſelf doth ſhew. For a Vitriolated, Aluminous, Salt ſpirit comes out with the flegm: and moreover good ſtore of Salt ſticks to the Neck of the Retort. In its Rectification, if the work be diligently plied, a white ſpirit aſcends, like the *Naphtha Babylonica*, which takes flame, ſo that it is not ſafe to hold lighted Candles near the Veſſels wherein *Succinum* or yellow Ambar is diſtilled. A twofold Oyl may be drawn forth, Yellow and Red anſwering to *Petroleum*. The black Feces or Dregs, if it be ſuffered to ſtil till it is dry, do grow together into a Bitumen very like that of *Iudea*.

It Dries and Warms; it helps the diſtillations of the Head, the Falling-ſickneſs, Apoplexy, Palſie, Mother-fits; is good for ſpitting of Blood and the Conſumption, alſo for the *Gonorrhæa*, to Facilitate Child-Birth, and to provoke Urine: The Smoak thereof is an Enemy to Venemous Beaſts, and Detects ſuch as have the Falling-ſickneſs. *The Virtues of yellow ambar.*

Of kin to *Succinum* is *Gagates* or Jet, ſo that ſome take it to be the ſame. It is alſo a kind of Bitumen, or a Bituminous ſtone, for the moſt part black; yet ſomtime of a pale or yellow colour. 'Tis ſoon ſet on Fire, ſmels like Bitumen. It *Jet.*

detects such as have the Falling-sickness, by the Smoak thereof; and hath a softening and discussing faculty.

Asphaltus. There is yet another kind of Bitumen, but more concrete, which is called by the general Name *Asphaltus*. It is an hard kind of *Asphaltus* or Bitumen, and hath no filth mixt with it. It is of a solid substance, and shines like purple when it is broken. It is weighty and of a strong smel. Of this kind, that of *Sodom* is the best. That which is more impure doth not shine so, nor hath so strong a smel. It Dries and Heats, Discusses, Mollifies, and sodders Ulcers: it takes away fits of the Mother in a Suffumigation. See *Dioscorides* in his 1 *Book*, *Chap.* 83. *&c.* and the Commentaries of *Matthiolus* and others.

Finally, To the Family of Bitumens are to be referred certain Bituminous Earths and Stones. For it matters not much whether you cal them Earths or stones. Their first and chief Original is from Bitumen, with which as there is more or less of an Earthy and Stony matter conjoyned, so it receives this or that Name. And hence it is that in the Nature of Bitumens we meet with great difficulty, whiles Writers regarding the places where they are bred, or the outward Figure, but little considering the internal Nature, either they separate things of the same kind, or confound and Joyn together things of different kinds.

For this Bitumen of which such kinds of Earths and Stones do consist, is not sincere and pure Bitumen, but mixt with Earthy Juyces, Mud, Potters Clay, Veins of Metal and Stones. Of this kind is *Terra Ampelitis* so called, which is black like Sea-Coals, and resembling Bitumen; it dissolves in Oyl, resists worms, and Dries and softens as *Asphaltus* doth. Some account this *Ampelitis* Earth and Pit-Coals to be all one, but others make a difference. If they are not just one and the same, at least they are much of kin; whence come the sundry Names of the Germans which they give these kind of Bodies, as *Schwartze*, *Kreide*, *Koblerde*, *Steinkehlen*, *Bergkolen*, *Dorff*, *and Durpte*. For these kinds whether of Stones or Earths, have all one Root and Mother, *viz.* Black Bitumen: the Particular difference proceeds from the Various manner of Concretion and Admixture of other things.

Terra Ampelitis.

For that which the Germans cal *Dorff*, and *Durpte*, Peat and Turfe, are Bituminous Earths which they Cut and Dry for Fewel. It is digged in *West-Frise-Land*, *Gelderland*, *Flanders*, *Brabant*, *Zeland*. It is also found in *Collao* a Province of *Peru*, which *Monardus* describes in these words. In *Collao* a Province of *Peru* there is a place quite bare, without Tree or Grass, because the Earth is Bituminous, out of which the Indians draw a liquor, good to cure very many Diseases. The manner of their drawing of the said liquor is thus. They cut the Earth into Turfs, which they lay in order upon poles or thick Reeds in a Sunny place, having vessels under them to receive the Liquor. For by the Heat of the Sun this Bitumen Melts, or the Juyce included in the Earth dissolves and sweats through. Afterward the Turfs remain Dry, and Robd of their Oyly Liquor, and so become fit for Fuel. But the Fire made of them is hurtful, by Reason of the thick blackness of the Smoak, and the stinking smel it makes. Yet for want of other Fuel they use the foresaid turfs. The Liquor which fals from them is good for many Diseases, especially such as proceed from cold. For it Mitigates pains, and discusses cold swellings. Wounds are cured therewith, and other Diseases for which *Caranna* and *Tacamahaca* are good. Its color is dark Red inclining to black, and its smel is strong. In *Saxony*, *Misnia*, *Low-Germany*, *Scotland*, and other places, Bituminous and Fat Turfs are found: the Germans cal them *Motten*.

Sea-Cole or Pit-Cole. Lithanthrax, *Carbo Mineralis*, or *Fossilis*, or *Carbo Lapideus*, Stone-Coal, Mineral-Coal Pit-Coal or Sea-Coal, is harder and of a stoney Nature, consisting of Bitumen and a stone making Earthy Juyce, Black, good to make Fires, especially for Smiths Forges. 'Tis found in *Germany*, *Bohemia*, *Scotland*, in many places.

And some hath in it more Bitumen, and some more of the Stone making Juyce: and therefore some of it will easily burne, but some wil not burn, unless it be mixed with other Coals and blown with bellows.

But he that would know more concerning Bitumens, let him read the Commentaries upon *Dioscorides*, especially that rare third part of *Andræas Libavius*, wherein largely and learnedly he explains the History and Nature of all sorts of Bitumen.

In

In the next Place comes Sulphur, or Brimstone, which the Greeks call *Theion*; it is a Mineral Juyce, consisting of one part which is inflamable and sends forth a grievous smel, and of another part which is Earthy, thick, and fixed, having a vitriolated Juyce mingled therewith. It is reputed the Agent and Father in the Generation of Metals, and Coagulates the Mercury; if there be conjoyned a Metalline Spirit, and a Seminary Principle. Of which if it be destitute it destroies Metals, and consumes such things as are volatile. Now it is twofold, Native or Quick, *Apuron*, which hath not felt the Fire. For it is engendred pure solid and in clods, so that there needs no Fire to separate its Impurities. The Ancients describe it to be transparent. And now adaies there is hardly any such found; but it is of an Ashy color, and when it is broken, Yellowish within. Factitious or Artificial Brimstone is boyled out of the Sulphurous mine which is digged out of the Ground. Now there is some difference in the Artificial, especially in regard of Purity and colour depending thereupon, and some is yellowish, other some paler, and some enclining to an Ash-color. *Brim-stone*

Of Sulphur and Quick-silver is made *Cinabrium Factitium*, Artificial Sinoper. Of the Smoak of inflamed Sulphur received in a Glass Bell is made a sharpe Liquor, like Spirit of Vitriol. And flower of Brim-stone is the purer part thereof, being sublimated with Salt and Calcined Vitriol.

Now Brim-stone is of a digesting, discussing and drawing faculty, it is good for such as breath short and have an *Empyema*, taken in an Egg. Externally applied with Butter and Hogs-Greece, it Cures the Itch; and with Turpentine it heals the Tetter. *The Virtues of Brim-stone*

Neighbor to Brim-stone is Arsenick, Orpment, and Sandarach, which seem to agree in Nature and Faculties, and only to differ, because the one is more the other less digested in the Bowels of the Earth; or that one hath more or less Quick-silver and Salt mingled with the Sulphur. Some take Arsenick for the kind, and call Orpment Saffron-colour'd Arsenick; Sandarach, red Arsenick; Risagal, white Arsenick. But that which they cal white Arsenick, is now adaies known by the Name of Arsenick absolutely: *viz.* Orpment so often sublimed with Salt til it become white, and Transparent like Chrystal: the strongest of all Eating and Fretting Putrifying Poysons. Now Orpment is a Sulphureous Mineral Juyce, having joyned therewith a little Quick-Silver, and the Spirit of Salt. Al the kinds are caustick and corrosive, and Enemies of the inward parts, which they fret, and consume the radical moisture. Yea, it is not safe to apply Arsenick externally by Reason of its extream Venemous and Corrosive Nature. But if it be Calcined with Nitre, its volatile mercury and inflamable Sulphur are taken away, and a certain buttery Fatness remains, which is used externally for Fistula's and Ulcers hard to cure. *Arsenick, Orpment and Sandarach.*

Hither also we must refer Antimony, *Stimmi* or *Stibium*, which although it seems to come nearer the Nature of Metals, yet is it a Mineral Body, resembling Lead, but brittle, consisting of Sulphur, crude Arsenick and much Quick-silver of an Earthy Nature, but all of them volatile. And therefore it yields a stinking and hurtful Fume, which for the most part is Mercurial, but in some part Sulphureous and Arsenecal. Being crude applied externally it imitates the Virtues of Lead, and is binding, hinders the growing of flesh, takes away the filth of the Eyes, and cures Ulcers. It makes great work for the Chymists, who make thereof sundry purging and sweating Medicaments; of which they have written whole Books, wherewith you may consult. *Antimony.*

Finally, Betwixt Antimony and Lead is *Bismuthum*, which is therefore called Ash-colour'd Lead; being a Mineral Body whitish and Livid, Hard, Brittle, consisting of Earthy and crude Mercury, Sulphur and Arsenick, and all of them impure and Volatile. *Bismuthum.*

And that we may conclude this subject, those various kinds of Earths and Minerals which we have mustered hitherto, (and if there be any other to be reckoned,) they have their original from the Roots of Minerals. For in these also there happen sundry corruptions. For although Gold and other Metals now perfectly digested do not putrifie, and seem incorruptible; yet in their first Original they may be corrupted. So *Terra Sigillata*, of which we spake before, is thought to be nothing else but the first matter of Gold, Silver, or some other Metal (for there are sundry kinds thereof)

thereof) corrupted, *viz.* When the principles of Metals do not remain united, but the Sulphur and Mercury are Separated and Sublimated, and either transferred into some other place, or dispersed into the Air. So Antimony seems to be nothing else but crude or raw Gold, corrupted before it was ripe; and *Bismuthum*, immature Silver corrupted.

Chap. 4. *Of Stones and Jewels.*

THe hardest of Minerals are Stones. And since that under this kind are comprehended both common Stones and Precious Stones or Jewels, we must first speak somthing in General of the Generation of Stones. It is commonly held, that by the concourse and mixture of Elements, the first and Second qualities Co-operating, Stones and precious Stones are produced. And though it is not to be denied, but that the Elements do concur unto their Constitution: yet the Elements alone do not suffice, and are only the remote cause of Stones and Jewels. Be the Elements mixed how they can, yet the Primary agent being absent, no precious Stone is made of them.

The Generation of

They who would produce a nearer Cause, have made exhalations the matter of Stones: but that also is too remote, nor wil it suffice alone, unless it be more specially determined. *Avicenna* therefore and *Albertus Magnus*, that they might come more near to the business, have held the matter of Stones to be Clay and Juyce, *viz.* A clammy roaping Clay, to the mixture whereof more Earth hath concurd then Water: and a Juyce that been hath suckt in, and raked off from the Earth, or that hath a Tincture of some Metal. This opinion others follow, and hold that Stones are made of Clay or Earth glewed together with a clammy moisture, such as are dark; and with a Transparent Liquor such as are clear and Transparent.

Yet in truth, not only Water and Earth, but all the Elements are in Stones, especially precious ones. Yea, and the Chymists think the Elements are not sufficient, but that as Metals so Stones and Jewels they say are made of those three principles, Mercury, Sulphur and Salt. Of which opinion I shall speak elsewhere.

This only we shal hint in this place; that the matter of Metals, Stones and Jewels, is very near of kin, which not only the place where they grow but many other things do witness. For examples sake, let us take Pome Garnets, out of which and Iron Tinctures are drawn so like, that it is not easie to discerne one of them from another; and a more base sort which are found in *Silesia* and *Misnia* do resemble Iron also in color. Also many Stones, if they are burnt, do send forth Sulphureous fumes, just as Minerals and Metals do; and of Metals Glasses are made which do very much resemble some precious Stones. And therefore Jewels and Metals seem not unfitly to be reduced to common principles: and it seems possible to reduce Jewels to some certain Metals.

The efficient Cause.

Authors do stick yet more in Explaining the Efficient Cause of Stones: and the most have recourse herein to Heat and Cold, and favour nothing beyond the Elementary qualities. And among Stones, those which they count to be made of Clay, they think are coagulated by being baked together by Heat and dryness: and such as they conceive to consist of a watry matter, they hold to be Coagulated and hardned by vehement cold, as Crystal. But many such dark Stones are generated in the midst of Waters and springs, whose Coagulation cannot be made by the baking of heat and dryness. And they are truly too simple, who think that Crystals, Adamants and such like Stones, are frozen together by the Cold; since they are generated in the hottest Countries on the Surface of the Earth, both Adamants and other transparent Jewels; nor will they melt with Fire.

The true Cause of Concretion and Coagulation.

The Chymists hold Salt to be the Cause of Concretion and Coagulation: against which opinion of theirs although some fiercely dispute, yet is it not absolutely to be rejected; seeing many evident Documents do prove the same; and certain it is, that many things are Coagulated and grow together in moist subjects, where neither dryness, Heat, nor cold have place. Yet, seeing there are two sorts of Concretion, which happen without adding or taking away any part of the matter: they

A double Concretion

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are in no wise to be confounded, and we must speak distinctly of the distinct manners of Coagulation.

The Concretion of Salts:

The former manner of Concretion is seen in Salts, as in common Salt, Vitriol, Nitre, Alum, Urin, and in the Salts made out of Plants and Animals may be seen; and it is proper to Salts, which naturally tend to such a Coagulation, and indeed under a certain Figure; as the said diversity is to be seen in Nitre, Vitriol, Alum and other things.

The cause of solidity and hardness:

But because Salts have not hardness of themselves, but are easily broken and dissolve in moisture, but Jewels and Stones do not only grow together, but they are solid and hard. and do not melt in moisture: this kind of Concretion or growing together is different from the former. The cause of which concretion some do also refer to Salt, and the hardness to the admixture of Earth therewith: But others again (& that probably enough) do hold that this Stoney hard concretion or growing together of Bodies doth proceed from a Stone making spirit or Juyce, which Stone making spirit and Juyce is every where found in the Earth and in the water, but not without Salt.

The Immediate Cause of Stones and precious Stones

And thus the immediate cause of Stones and Jewels is agreed to be a Stone making Juyce, that is to say, a matter of its own Nature tending to such an hardness and solidity. Now that several Stones and Jewels are generated, proceeds from the especial form of each. For every precious Stone hath its proper and specifick form whereby it is differenced from al other, which it obtains from, (as I may say) its Seminal principle of Generation. Which doth not proceed from the Mixture of the Elements, but, as *Scaliger* rightly Names it, it is a fitt essence, put into this sort of Natural things by almighty God, at the first Creation of the world. Which seminal principle and *Architectonick* Spirit, although it doth not appear in a Body peculiarly distinct, as in most plants, nor can its Essence be sufficiently explained, yet must it not be therefore denied. For as the Willow, though it produce no Seed as other Plants do, yet it hath a Seminal principle dispersed through the whole tree, and so is propagated by a bough cut off and stuck in the ground: so the Seminal principle of Jewels and Stones lies concealed in the Stone making matter; and in this darkness of our Minds its essence is unknown to us, as al other forms are; and their difference is not known save by the diversity of their faculties, operations and Qualities. For upon this diversity of Forms, fit matter being Joyned thereto, depends the diversity of colours and external shapes.

Hence the Crystal and *Adamant* of *Hungaria* and *Silesia* have an Hexagonal or Six-corner'd shape; the Occidental Smaragds are four Square; the Bohemian Granate and the Stone *Geodes* have a Globous Figure; and other precious Stones have other shapes.

Whence the Colour of precious Stones is:

Now I conceive the Colours of precious Stones may chiefly be drawn from the Sulphur of Metals. For, Carbuncles, Rubies and Granats, do participate in their Tincture with Gold and Iron: The Turkois hath the Tincture of Copper. And there may by Spirit of Salt, Urine, and other liquors, Tinctures be drawn out of Metals, which do perfectly resemble the Colours of certain precious Stones. And from the same causes, *viz.* The forms and Mineral principles, other qualities also of Stones and Jewels, as hardness and weight. &c. As also their Virtues and properties do flow.

The Natural place of precious Stones:

As to their Native place, Stones are found every where; precious Stones, as in many other Countries, so in *Misnia*, *Silesia*, *Bohemia*, and other places of *Germany*. But the more noble precious Stones are chiefly found in the *Indies*. The cause whereof is diversly by divers assigned; and the most refer the same to the posture of the Sun and Stars over the Zenith. Yet since in *Africa*, *America*, and other Regions which are under the same climate, there is no such store nor such excellent precious Stones found: the cause is rather to be attributed to the Nature and disposition of the Soil, and the Seminal principle implanted therein at the Creation.

The difference of Stones:

Now Stones are some vulgar, others precious, according to the Purity or Impurity of the matter whereof they consist, and the nobility of the Form. For vulgar Stones consist of a gross and impure matter, and have a more Ignoble Form: and therefore their effects are less excellent. But precious Stones consist of a more pure and Subtile matter, and have a more noble form. For the Chalk-stone, and other

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common Stones have alſo their ſulphur, which is ſufficiently diſcovered when they are burnt; but much thicker and impurer then the Granate or Amethyſt.

Ground Unicorne Now Stones are ſome Spungy, others Solid. Amongſt thoſe kinds of Stones that is juſtly in the firſt place to be explained which is vulgarly taken for Unicorns Horne; and ſome cal it ground Ivory, others ground Horn. For in *Thuringia*, as alſo in *Bohemia* and other places, ſuch Horns are found; yea, and not only horns but other bones alſo; which are ſaid to be good to Sodder wounds and to heal Ulcers. *Its Uſe* But eſpecially, experience hath taught that theſe Stones have no ſmal uſe in the Falling-ſickneſs, Malignant Feavers, the Peſtilence, gripings of the Belly in Infants, and the Cure of other Diſeaſes; and therefore they are commonly given out for Unicorns Horns. Howbeit they may eaſily be diſcerned from the true Unicorns Horn. *How it may be known from true Unicorns Horne:* For the true Unicorns Horn is hard and ſolid, that it can hardly be raſped, much leſs can it be beaten to pouder: nor doth it much cleave to the Tongue; But this Stone is not hard, but as it were calcined, it is eaſily broken and rub'd to pouder, and being put to the Tongue it ſticks faſt, like *Terra Sigillata* or Bole-Armeniack.

Touching the Generation thereof, Men are of ſeveral opinions. Some conceive they are the bones of an Unicorn overwhelmed in the Earth by a flood, or ſome other occaſion, which remain after the fleſh and ſofter parts have been conſumed by Time. But this opinion is not agreeable to reaſon. For how ſhould there be ſo great a number of Unicorns, in *Thuringia*, the Hercinian Foreſt, near *Elbingroda*, alſo about *Heidelberge*, *Hildeſheme*, in *Miſnia*, *Sileſia*, *Moravia*, and in many other places? And why are theſe horns found in thoſe places rather then elſewhere, where it is more likely that there are Unicorns? Moreover ſtones are found, which repreſent the Bones not of this Creature only, but of others alſo.

Its immediate matter: More probable therefore it is, that theſe are Mineral Stones. But what is their immediate matter is not eaſie to tell. Some hold that it is Bitumen or corrupted Ambar; others, as *Anſelmus Boetius*, *Lib.* 2. *Cap.* 242. that it is *Marga*, or a kind of Marle; others that it is ſome putrified and rotten Stone. This is certain, that it is a mineral matter, not unlike ſome *Terra Sigillata*, or a Mineral Juyce mingled with ſome ſuch Earth, and ſhaped into the Form of an Horn, Tooth, or other bone.

Nor let that ſame external form ſtumble any man. For though no man can eaſily tel the Cauſe of its Conformation, though many have labored to do it; yet certain it is, that many wonderful things are ſhaped in the Earth. Not to ſpeak of other things at this time, 'tis ſufficiently known, how many ſundry ſhapes are ſeen in Stones digged up at *Iſlebia* and elſewhere. For there are ſeen in thoſe Stones ſundry ſhapes of Animals and Plants; of a Frog, a *Salamander*, a Serpent, a Viper, an Eel, a Carp, a *Gilthead*, a Gudgeon; Yea, and the Pictures of Princes and renowned Men. And what ſhould be the cauſe of theſe Pictures 'tis hard for any man to tel.

As to the Virtues of theſe Stones, 'tis certain they are very good againſt the Falling-ſickneſs, and Malignant Diſeaſes, and therefore they are many times uſed no leſs ſucceſfully then the Horn which is counted to be the Unicorns.

Spungy ſtones: Now vulgar Stones are either Porous or Solid. The Porous or Spungy Stones, are the *Tophus* or crumbling gritty Stone, the *Pumice*, the *Oſſifragus*, the *Oſteocolla*, *Stalactites*, and moſt of thoſe Stones which are bred in living Creatures.

Solid ſtones: The ſolid Stones are many, the Sand-ſtone, the Chalk-ſtone, the Flint, the Fire-ſtone, the Whet-ſtone, the Touch-ſtone, the Smiris wherewith they cut Glaſs. Sundry kinds of Marble, Alabaſter, Serpent-ſtone, Porphyry-Stone, Free-ſtone, *Ceraunias* or Thunder-ſtone, the *Belemnites*, ſo called; and very many more.

Alſo there are other Stones of a middle Nature betwixt thoſe common groſs Stones and the Noble precious Stones: I ſhall only ſpeak a little of one or two of them.

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The Load-ſtone in the firſt place, is a ſtone ſufficiently known; and its effects are wholly wonderful, the cauſe whereof many learned men have hitherto labored to render. Now the effects of the Load-ſtone are either of the Stone alone, or of Iron toucht with the Stone; or of both the Stone and Iron. The ſimple effects of the Stone are, to draw Iron to it, and to turn towards the Poles of the world. That it drew Iron was a thing not unknown to moſt of the Ancients; but its faculty of turning to the Poles of the world, as it is at this day very well known, ſo was it not known to the Ancients; nor hath any man been able as yet to make it appear, that it was known to *Ariſtotle, Dioſcorides, Theophraſtus, Lucretius, Pliny*, or any of the Ancients: but this Virtue was firſt diſcovered ſome few Ages ſince; although it is uncertain who was the Author or Inventor. *The Load-ſtone and its wonderful effects.*

But what is the Cauſe of this motion, and whether it ſhould be ſought in Heaven or in Earth, is very obſcure. But that we may ſearch it out as much as is poſſible, we muſt preſuppoſe this in the firſt place, that the Load-ſtone in many places doth not turn exactly to the Poles of the world but towards them, declining a little from them, in ſome places more, in others leſs. Which declination from the Poles of the world is altogether of great uſe and moment. For whereas the Ancients at Sea knew only in the day time by the Sun in what Meridian of the world they ſailed; and in the night they knew by the Stars the Elevation of the Pole, and in what Latitude of the World they were: now by the help of the Load-ſtone they can find in what Longitude they are: and ſeeing it is confeſſed by all the Ancient Geographers, that nothing is more difficult in al Geography then to find out the Longitude of places, for which cauſe they do ſo much vary in aſſigning the Longitude of the moſt Famous Cities: by help of the Load-ſtone alone the Longitude of every place may moſt eaſily and exactly be found out. The Ancients indeed reckon'd their degrees of Longitude from the fortunate Iſles, and there they made the beginning and end of the Globe of the Earth. But the late Coſmographers obſerving that the Pole of the Load-ſtone and the Pole of the world did conſiſt in one Meridian, in the tenth degree beyond the fortunate Iſles Weſt-ward, about the *Azores* or Flandrick Iſlands; they make the beginning of Longitude there, not only to pleaſe themſelves, but moved thereto by this Natural reaſon Namely becauſe in that Meridian the Poles of the Load-ſtone and the Poles of the world do agree together. Now from that Beginning and Meridian, towards the Eaſt, the Declination encreaſes more and more, and it is greater or leſſer, according as the place is nearer to, or further from this firſt Meridian. In *Germany*, eſpecially about *Norinberge*, the Declination is ten degrees; here at *Wittenberge* about nine. The Hollanders who have ſailed into *Norwey* and the neighbouring places towards the Eaſt, have found the declination of the Load-ſtone from the Meridian to be ſixteen degrees; and at *Nova Zembla* ſeventeen degrees in the more Eaſterly parts, provided they made their obſervations with exact Inſtruments. And it is probably aſſerted, that if the Hollanders ſhould finiſh their Navigation towards the Eaſt, the more Eaſterly they went and the nearer to *China*, they ſhould find the declination of the Load-ſtone from the Meridian ſo much the more abated, and they ſhould at laſt come to that place towards the Eaſt, in which the Poles of the Load-ſtone and the world would be in one Meridian, and that there would be no deflection of the Pole of the Load-ſtone in the hundred and eighty degree of Longitude, oppoſite to the beginning of Longitude in the Weſt.

Yet there is a certain learned Man who holds that the Hollanders are deceived in this point. For when they looktupon their compaſſes they did not conſider that the Compaſſes were ſo made, that the Iron toucht by the Load-ſtone was not placed juſt under the Flower-de-luce painted upon the card, but was diſtant therefrom certain degrees. And therefore whiles the Hollanders lookt upon the Flower-de-luce, and ſaw that it pointed directly towards the North, they conceited that there was no Magnetical declination in that place; whereas the Iron toucht with the Load-ſtone was ſome degrees diſtant from the Flower-de-luce or the true North-point. Aud therefore he placed the firſt Meridian, with the Ancients, in the fortunate or *Canary* Iſlands, becauſe in that place there was no declination of the Load-ſtone at all. In which point experience muſt be judg. Yet it ſeems to me improbable, that the Hollanders who knew very wel how to make their compaſſes, ſhould be ſo heedleſs in ſuch a Caſe.

But be it how it wil be, this is certain and confirmed by manyfold experience, that the Pole of the Load-ſtone is diſtant from the Poles of the world twenty three degrees or thereabouts.

And hence ſome do probably collect, that the declination of the Poles of the Load-ſtone from the Poles of the world, and the declination of the Poles of the world from the Poles of the Zodiack, is one and the ſame; and ſince the utmoſt declination of the Planets is twenty three degrees and ſome minutes, that doubtleſs therefore the declination of the Poles of the Load-ſtone from the Poles of the world is the ſame.

The Cauſe of the Loadſtones turning to the Pole.

But doubtful it is whether the Cauſe of this motion of the Load-ſtone towards the Pole is in the Heaven or in the Earth, and where in the Heaven, or in the Earth. Some are indeed of opinion that there are certain Mountains of Load-ſtone under the Pole, to which the Load-ſtone moves by ſimilitude of Nature. But they cannot wel rel what or how great thoſe Mountains are; nor are mines of Load-ſtone wanting in other parts of the world, but they are found in many Regions, eſpecially in *Egypt*.

Others ſay the Load-ſtone turnes to the Pole-Star, others that it turnes to ſome Stars about the Pole-Star. But the Load-Stone doth not look directly to the Pole; ſave in ſuch places where the Meridian goes through the Pole of the World and the Pole of the Load-ſtone both at once: in al other places it declines.

Moreover, that which is ſaid of the converſion of the Load-ſtone to the North pole, is now adaies called in queſtion by learned Men. And ſome do make two oppoſite points in the Load-ſtone, whereof one turnes to the North, the other to the South, if the Stone hang moveable and free. Which though others do not wholly deny; yet they ſay that point is ſtronger which turns to the South then that which turns to the North, and ſo they hold that the Load-Stone turns rather to the South then to the North. And though there were nothing in the Load-Stone which did Naturally turn to the North; yet its turning to the South is ſufficient to ſhew the North-Pole. For ſince the South-Pole is juſt oppoſite to the North, if one part of the Load-Stone or of the card touched with the Load-ſtone turne to the South, the other end muſt of neceſſity point to the North. Of which this is a remarkable token, that thoſe who make compaſſes and Sun-Dials with magnetick Needles, do rub the Load ſtone upon that end which ſtands to the South, and not upon the Croſſend which Looks to the North; and therefore the Magnetick Needle turns primarily to the South, and the oppoſite part points to and ſhews the North.

Hence therefore ſome have come to be of opinion, that the Load-ſtone is turned towards the South; becauſe all the Planets have their Efficacy and Operation in the South. Since they move from the Eaſt, through the South, towards the Weſt. Yet in very deed, although it go ſo in our Regions: yet there are oppoſite places, wherein the Ecliptick declines from the Æquator towards the North, and the Planets perform their courſes, from the Eaſt, through the North, towards the Weſt. Moreover the Planets do not abide in the ſame place, but one in one place, another in another; moreover they do not ſtick faſt, but paſs over the whole Heaven every day. If therefore the Load-ſtone ſhould look towards the Planets, it could not look towards one place, ſince there are divers Planets; nor would it ſtand ſtill, but ſhould be alwaies moved, following the motion of the Planets.

The opinion of others is more probable who hold, that as other things tend to their own proper place: ſo the Load-ſtone unleſs it be hindred doth alſo deſire alwaies the ſame Scituation which it had in its Native place. Wherein nevertheleſs we muſt conſult with experience, and enquire how the Load ſtone is Scituate in the Mines.

But that Opinion is moſt probable, that the Load-ſtone is moved towards its own Pole in the Earth, which is diſtant about twenty three degrees from that point which anſwers to the Pole of the World: and that either the South only, or if the Load-ſtone have two Poles, and one part thereof turns to the North, another to the South (concerning which we muſt again conſult with experience) yet that it chiefly tends to the South: and that it hath ſome affinity with its own place, or with the things that are there; and that doubtleſs the point to which the Load-

ſtone

ſtone moves muſt be held to be rather in Earth then in Heaven. For that ſame point is fixed; but the Pole of the Zodiack, or any other Star thereabouts to which the Load-ſtone ſhould be moved, doth it ſelf move and finiſhes its round in the ſpace of twenty four hours; whereas the Load-ſtone doth perpetually turn to one point. Nor can it be perceived that the Load-ſtone, or the ſmalleſt Iron Wires toucht with the Load-ſtone do ever move upwards towards Heaven. Contrariwiſe, good Authors relate that the Load-ſtone tends towards the Earth, which may be proved, they ſay, by theſe experiments. If you place a Needle in *Æquilibrio* ſo ſo that both ends are equally diſtant from the Earth, and then touch one end with a Load-ſtone; they ſay that end will bow towards the Earth more then the other. Alſo if you weigh pieces of Iron Wire, and after they are toucht with a Load-ſtone put them in the Scales again, you ſhall find that they weigh more then they did before they were touched, becauſe they encline towards the Earth. And therefore, ſince two Poles of the Load-ſtone are to be conſtituted in the Earth, one diſtant about twenty three degrees from the point juſt under the North-Pole of the world, towards the place now called the ſtraits of *Anian*, the other in the South part oppoſite, Scituate in the Meridian which paſſes through the *Azores* or Flandrick Iſlands, *Caput Viride* and *Caput Corvo*, or (as others will have it) which paſſes through the *Canary* Iſlands: in all places under this Meridian there is no declination of the Load-ſtone, but the Needle touched by the Load-ſtone falls exactly with the Meridian; in all other places of the whole Earth the ſaid Needle declines from the Meridian of the place, ſomtimes more, ſomtimes leſs, ſomtimes towards the Eaſt, otherwhile towards the Weſt; whereof ſee the obſervations of the Hollanders, and the Mathematical Memorials of *Simon Stevinus*, in the 5 Book of his *Geography*. But what that is to which the Load-ſtone is moved, is hard for any man to tel: let that ſuffice us, which *Scaliger* writes in his 131. *Exercitation*, where there are alſo other things concerning the Load ſtone, worthy to be read: *Nature* (ſaith he) *being linkt in a league of Amity to it ſelf, hath allied all things as well thoſe above as theſe here below in a perpetual band of friendſhip, which makes all this world to be one thing admirably diſpoſed; ſo that there are not only certain degrees as it were of approach and diſtance in things ſeparated: but alſo the Commixtures of thoſe ſubſtances, which are quite parted one from another.*

Now concerning the Virtue of drawing Iron (for I do not here diſpute, as *Scaliger* hath it in *Exercit.* 102. *Sect.* 6. whether the Load-ſtone draws Iron, or Iron the Load-ſtone; for which ſo ever it is, the Cauſe is one and the ſame) the Controverſie is no leſs. *Epicurus* is ſaid to have held, that from the Iron and Load-ſtone *Atomes* do flow, which agreeing in Figure do imbrace one another, and ſtrike againſt the Bodies of the Load-ſtone and the Iron, from whence being reflected they draw the Iron. *Anaxagoras* held that the Load-Stone had a Soul and therewith drew the Iron. From whom *Cardan* differs not much, who alſo avers that the Magnet or Load-ſtone doth live; whom *Scaliger* oppoſeth *Exercitat.* 102. *Sect.* 5. *Marſilius Ficinus* in *Lib.* 3. *de Vit. Cœlit. Compar. Cap.* 15. fetches the Cauſe hereof from the Conſtellation of the Bear, to which both the Load-ſtone and Iron are ſubject, and both do orderly follow the Bear; but the Load-ſtone holds the upper degree in the propriety of the Bear, and Iron the lower; and that ſo the Load-ſtone as being in the upper order draws the Iron, which he reckons to be in the lower. *why the Load ſtone draws Iron*

But in good earneſt, if we ſhal diligently weigh the matter, we ſhal hardly find any thing more probable then that ſame mutual conſent of things Natural. For therein well-near al learned men that have pondered the Nature of the Load-ſtone do conſent, that the Load-ſtone is a kind of Iron Mine, and that Iron may be made thereof.

And here is to be obſerved, that the whol body of that which we cal the Load-ſtone, is not indeed the Load-ſtone, for the whole Stone doth not draw Iron; but that the ſubſtance of the Magnet is diſperſed in its ſtone like Veins; even as other Metals are ſeldom bred alone and pure, but in their Matrixes or Wombs, and therfore the Magnetick-ſtone draws the Iron only with that part, where is the Vein of the Load-ſtone.

From whence this alſo follows, that the Cauſe of Attraction is rather in the Load-ſtone then in the Iron. For the Iron is already a fixed metal: but the Load-ſtone is not yet fixed, and therefore it can more freely ſend forth its ſtrength and ſpirit.

Andreas Libavius, *Part.* 3. *Singul. Lib.* 1. *Chap.* 12. where he treates of the attractive Virtue of the Load-ſtone, endeavours to aſſign yet a more ſpecial Cauſe, and writes that the Nature of this principle in the Load-ſtone is Bituminous, which is reduced and directed to a ſingularity with the Iron, by ſimilitude of that conſpiracy and mixture, whereby the ſame principles have grown together in Iron: and that an Iron and Bituminous ſpirit is common to them both, but that it doth not flow ſo ſtrongly nor ſo continually from the Iron as from the Load-ſtone, becauſe of the different Coagulation or Conſiſtency. Where we willingly grant that a certain Sulphur or Sulphurous ſpirit is common to the Load-ſtone and the Iron: which if *Libavius* pleaſe to cal Bitumen (for he counts Bitumen to be a thing more general then Sulphur, and that Sulphur hath its original from Bitumen) I will not contend with him about the Name; but that Bituminous or Sulphureous things only have a mutual Appetite one to another, I ſee not how he can prove. Nor doth he tel us, whether they mutually deſire one another, by Reaſon of their Sulphur, or of their whole eſſence. But whatever is the Cauſe of the affinity betwixt the Load-ſtone and the Iron, which cannot be denied; that general Rule there laid down by *Libavius* holds true: one Nature covets another of the ſame ſort, and like will to like, as much as it can; eſpecially there where the Virtue ariſes and ſticks, and apprehends another like it ſelf.

The Load-ſtone armed.

We muſt not in this place paſs over the armed Load-ſtone, whoſe force is much ſtronger then that of the unarmed. For a Load-ſtone unarmed will draw only a Pack-needle or a bit of Iron hardly weighing a dram or two: but if it be armed, it draws ſixteen ounces or more. The Art of arming them, is this. Seek out in a Lump of a Load-ſtone its Poles, which may be done with the help of a Needle in a Sun-Diall; the Poles being found, let the Load-ſtone be poliſhed, and reduced into ſuch a ſhape as it is capable of (howbeit the long ſquar is the moſt convenient ſhape) yet ſo that the Axis reaching from the one to the other Pole may lie in the middeſt betwixt two parallel lines, equally diſtant from each of them. The ſides be ng formed, let alſo the upper and lower part be wrought and poliſhed, as alſo the ſides, to the ends of the Axletree. Then let two plates be framed of the beſt Steel, of which the one ſide which touches the Load-ſtone muſt be ſmooth and even, if the ſides where the Poles are be plain; or of what ſhape ſoever they be, they muſt be ſo fitted to the ſides of the Load-ſtone that no ſpace may be left betwixt the Steel and the Load-ſtone, but the other ſide muſt be a little round, and on the lower ſide the plates muſt hang a little beneath the Load-ſtone; and the parts that hang under muſt be ſomwhat thicker and ſquarer then the reſt like Pillars. The Plates being thus formed muſt be applied to the Poles on each ſide, and to keep them faſt they muſt be bound with two round hoops of Silver or braſs, which muſt go about the Load-ſtone above and beneath. Alſo let the upper ſide thereof be covered with a Plate of Silver or Braſs, with a Ring whereby to hang up the Load-ſtone thus armed. When it is hung up apply unto the little Pillars of Steel which come beneath the Stone a Plate of Steel as big as it can draw and there let it hang.

Bezoar Stone.

In the next place we muſt not forget Bezoar Stone, whereof Many things are extant in the writings of Phyſitians; ſeeing it is both precious and rare, and eſpecially commended againſt Poyſon. Some think 'tis ſo called from a Perſian word *Pazar*, or *Pazan*, which ſignifies a Goat. Others think 'tis derived from the Hebrew word *Bel* which ſignifies a Lord, and *Zaar* which is Poyſon. But an Antidote is by the Arabians called *Bedſoar*, and therefore they call all Medicines good againſt Poyſon, by the general term of Bezoartick Medicaments: whence Bezoar-ſtone ſeems to be ſo called becauſe of its rare vertue againſt Poyſon.

What Bezoar is.

Now Bezoar ſtone is not digged out of the Earth, but is bred in the belly of an Indian mountanous She-Goat, ſhaped ſomwhat like a Buck or Hart, and is therefore by ſome termed the Hart-Goat. The Stones are long and round, and ſomtimes like Cheſ-Nuts or Acorns. Their colour is ſomtimes blackiſh, ſomtimes yellowiſh, greeniſh, Aſh coloured, dark Red, or blackiſh Green. On the outſide it is ſmooth and ſlippery. It is not very hard but is eaſily broken. It grows together by Scales, Scale over Scale, as an Onion is made up, upon ſome ſmal Foundation, which is commonly a little Straw or Stalk; to which a certain humor cleaves. And therefore this Stone is made up of many Plates as it were, being greater

ter in an old, leſſer in a young Goat; and all the Plates both Internal and External are ſmooth and ſhining.

Now there are two kinds of Bezoar-ſtone, the one Oriental, which is brought out of *Perſia*, *Egypt*, *China*, *Cathai*, and the bordering countries, which is more excellent then the other; the other is occidental, which is brought out of *America* and *Peru*. This Stone is very much commended againſt all Poyſons; it is given in malignant feavers, to expel Worms in Children, and againſt Melancholick Diſeaſes. *Its kinds* *Its uſe.*

Some take *Lachryma Cervi*, or the Harts Tear, to be Bezoar-ſtone. But though, as I ſaid before, the word Bezoar is uſed by the Arabian Phyſitians to ſignifie Antidotes in general; and the *Lachryma Cervi* hath a rare Virtue againſt the Plague and Poyſons; Yet Bezoar Stone and *it* are divers things. Now concerning the *Lachryma Cervi*, which he ſaies he keeps as a great rarity in his ſtudy, *Scaliger* thus writes in his *Exercitat.* 112. *It is not bred in the Hart, before he be an hundred year old. After that age it grows at the Corner of his Eye, to the bones themſelves, and becomes it ſelf a protuberant bone, of ſuch hardneſs as exceeds that of the Horn it ſelf. That part which ſticks bunching out is round, of a rare brightneſs, of a yellow colour, not without ſome ſhew of black Veins. It is ſo ſmooth that you can hardly feel it, and it ſlips from between your Fingers, as if it could move it ſelf. It is an excellent remedy againſt Poyſon. Its given to ſuch as are taken with the Plague, with a little Wine. Whereby ſo great a ſweat is cauſed, that you would think the Patients whole Body were well nigh Melted.* Touching Bezoar Stone ſee a peculiar Treatiſe of *Caſparus Bauhinus*. *Lachryma Cervi:*

Moreover, of this kind there is Coral, *Lithodendron*, or Stone-tree, being a Sea-ſhrub, which when it is taken out of the Water turns to Stone. The reaſon whereof is, becauſe there is much Salt and Stone making juyce in the Plant: which the Chymical reſolution thereof ſhews, for all the coral well near turns to Salt. *Coral:*

And this is the common opinion of all Authors well-near, touching the Generation of Corals, who hold that Coral is ſoft under this Water, and afterward grows hard in the Air. Yet *Beguinus* in *Tyrocin. Lib.* 2. *Cap.* 10. queſtions the truth hereof, and ſaies it is a Fable, and relates from the report of credible witneſſes and certain experiments, that Coral is as hard in the Sea and under the Waters, as after it is drawn out into the Air.

There are three ſorts thereof: Red, Black, and White. The beſt is the Red and that which hath many cluſters. It Binds, moderately Cools; Cures the flux and vomiting of Blood, the *Gonorrhœa*, and Whites in Women. It helps the Falling-ſickneſs and is a ſtrengthener. *The ſorts thereof:* *Its Uſe:*

To this family alſo belongs the Stone *Ætites* or Eagle-ſtone, ſo called becauſe 'tis believed that the Eagle carries it to her Neſt to help her bringing forth of her young ones. It contains another ſtone within it. 'Tis found in many places: the Orientals ones are beſt. But they are found alſo in *Saxony*, *Miſna* and *Sileſia*. 'Tis thought to further Child-birth and to prevent abortion. To prevent abortion they tie it to the Womans Arme: to further Child-birth, to her thigh. *Eagle ſtone*

There are alſo other Stones found in Living Creatures, as the Cock-ſtone, the Swallow-ſtone, the Toad-ſtone, Crabs-Eyes ſo called, Carpe-ſtones, Perch-ſtones.

Before, *Lib.* 5. *Chap.* 2. among the ſorts of Alum mention was made of the ſtone *Amianthos*, which is commonly cal'd *Alumen Plumoſum*, Fetherd Alum, and ſold under that Name; but it belongs rather to this place. In daies of old it was made into Thred and Woven into Coverlids as if it had been Wooll, and thereof they made Funeral Coates for the Bodies of Kings, that the Aſhes of their burnt Bodies might be thereby ſeparated from the other Aſhes. But the manner of weaving the ſame is at this day unknown. *Amianthus.*

Of this Family alſo is *Hæmatites*, the Blood-ſtone, eſpecially good to ſtop bleeding. *The blood ſtone.*

Now come the Nobler Stones and Jewels. In the firſt place, the fragments of five precious Stones are known and uſed in the Apothecaries ſhops: and thoſe Stones are the Sapphire, the Hyacinth, the Sardius, the Granate, and the Smaragd.

The

the Sapphire. The *Sapphire*, in the first place, is of a Sky-colour, like the Heavens on a cleer day. The whiter Sapphire is called the female. It resists Poyson and strengthens. Being worn it hinders Pestilential Carbuncles from breaking forth, and laid upon a Carbuncle it extinguishes the same, and hinders venemous exhalations from passing thence to the Heart: being worn by a lascivious Person it looseth its brightness and beauty. It hinders fleshly desires, also 'tis commended against Diseases of the Eyes, and is said to strengthen them.

the Hyacinth. The *Hyacinth* is of a yellowish redness, and glisters as it were Gold, and imitates the flames of Fire. It is commended to cure the Plague, being worn in a Ring or hung about the Neck.

the Sardius or Carneolus. The *Sardius*, so called because first found at *Sardis*; also *Carneolus*, Cornelian, because in colour it resembles bloody water wherein raw flesh hath been washt. The Sardius worn is said to recreate the Mind, to drive away Fearfulness and sad Dreams; to which intent it goes into the Electuary *de Gemmis*. Being drunk with harsh red Wine it stops the Courses, and Blood flowing from any part of the Body.

the Garnet. The *Garnet* is red, but with some yellowishness resembling Fire, and it hath the colour of Vermilion. 'Tis said to strengthen the Heart, and resist Sadness and Melancholly.

the Smaragd. The *Smaragd* is a most neat Jewel, the most excellent of all green precious Stones, and by its pleasant Greeness it refreshes and recreates the Eyes. It is given against Poyson, and the bitings of venemous Beasts, and pestilential Feavers. Being tied to a Womans Hip 'tis said to further Child-birth; and being laid on her Belly to prevent Abortion. It is contrary to all Venereal matters, and if it touch the Skin of the Man that is in his carnal Embracements, 'tis said to break asunder. Worn in a Ring or hung about the Neck it preserves from the Falling-sickness.

the Adamant or Diamond: There are also many other precious Stones and Jewels. The *Adamant* or (as we say) Diamond, is so called, because it is unconquerable by Iron or by Fire. For it is the hardest of all Jewels, transparent like Water. Rare virtues are by many attributed to the Diamond; and it is said to be an Amulet against Poyson and Witch-craft, frightful Dreams, and the Night-Mare; and to resist pestilential Causes.

the Carbuncle: The *Carbuncle* hath its name from a burning Coal: It is commonly beleevd to give light in the dark, but there is no Eye-witness thereof. And therefore learned Men conceive, that if there be any such Jewel as a Carbuncle, it is a great and a noble one.

the Ruby. The *Ruby*, whose brightness and flaming redness shines above other stones. It resists Poyson and putrefaction, preserves from the Plague; it drives away sadness and fearful Dreams, and exhilerates the mind.

the Granate. *Granates* or *Garnets* are as it were imperfect and rude Rubies, of which we have spoken before.

the Amethyst. The *Amethyst* is so called, because it is thought to prevent Drunkenness, it is of a violet color, mixt as it were with Purple.

the Opal. The *Opal* is an exceeding beautiful Stone, which alone hath in it all the colours of other precious Stones. For there is in the Opal, as *Pliny* in his 37. *B. ch.* 6. writes, the thin fire of the Carbuncle, the bright purple of the Amethyst, the Greenness of the Smaragd, all shining together with an incredible lustre. And therefore it cannot be counterfeited, as other precious Stones may. And as it hath the colours of all other Stones, so it is thought to have all their Virtues. But it is most commended for preserving the Eye-sight, being worn.

the Topaz or Chrysolite. The *Topaz*, which is now called the Chrysolite (though some difference them by the brightness of the colour) receiveth it name from its colour: for it is a Jewel transparent and of a Golden color. It is commended to strengthen the Heart and to drive away Melancholly: but is especially used against the Falling-sickness, and applied to Wounds to stop the Blood.

the Beryl. The *Beryl* in its color represents the Greenness of the Sea when it is calm, or the colour of a watry Hyacinth. It is chiefly commended for Wounds in the Eyes, being reduced to most fine Powder.

the Crystal. The *Crystal* indeed was named by the Ancients from Ice, and therefore some have held that Crystal is made of Ice frozen together upon exceeding cold Mountains. But this is false. For Crystal is generated also in *Cyprus*, and other Mountains, where Heat is never wanting. Again it wil not melt with Fire, as those things use to do which are frozen: but the Fire reduces it into Earth and Salt. And doubtless it is coagulated by a Salt spirit of stone-making juyce. Being made into fine Powder, and given with Honey in Wine or Broth, it is said to encrease Milk by a propriety which it hath. Held under the Tongue

it quenches thirſt. A dram taken with Oyl of ſweet Almonds is a preſent help for ſuch as have taken Mercury Sublimate. Alſo it cures the bloody Flux, and the Whites in Women.

The Jaſper.

The *Jaſper* is of many colours, and therefore they make divers kinds thereof. That which is reddiſh is much commended againſt a Flux of Blood from the Noſe, Womb and Hemorrhoides; Yea, and it is alſo commended for Wounds: and credible perſons report, that a Flux of Blood and the Womb Flux, which could by no means be ſtopped, hath been ſtaid by a Jaſper Stone bound to the Womans Thigh; as alſo Noſe-bleeding that no other Remedies would cure, hath been ſtopped by hanging the Jaſper Stone about the patients Neck. Alſo 'tis commended to cure the Falling ſickneſs, if it be worne upon the Mouth of the Stomach.

The Nephritick Stone.

Some few years ſince there hath been brought out of new *Spain* a Stone called *Lapis Nephriticus*, the Kidney-ſtone; which is juſtly counted as a kind of Jaſper. Its Surface is alwaies fat, and as it were ſmeared with Oyl. There are ſundry kinds thereof in reſpect of colour. For the moſt part it is of a whitiſh Green. It is commended againſt pains in the Kidneys, from whence it had its Name; and being tied to the Arm it has a wonderful Virtue, yet confirmed by experience, to break the ſtone and drive it out by Urine: of which later Phyſitians that have written of the ſtone, do every where ſpeak.

The turcoiſe.

The *Turcoiſe* is a Stone, not tranſparent, yet of a very pleaſing colour, being a mixture of green and blew. It is believed to ſtrengthen the Heart and Spirits. But eſpecially they attribute thereunto admirable Virtues to preſerve a Man from falling. For if a Man be any waies in danger of a fal, and wear this ſtone, it preſerves him harmleſs; and they ſay the Stone it ſelf will break or loſe its Colour and grow Pale, when the party is in danger of a fal. The ſame it wil do, they ſay, when the wearer is not well.

Lapis Lazuli.

Lapis Lazuli ſo called by the Arabian Phyſitians, and by the Greeks *Cuanos Lithos*, is alſo a Stone that is not tranſparent, of a deep blew color adorned with Golden ſpecks. This Stone hath a rare Virtue to purge Melancholy Humors, and therefore it helps Diſeaſes ſpringing from that Humor: of which ſee the writings of Phyſitians. Of *Lapis Lazuli* is made that moſt excellent blew colour, cal'd *Ultramarinus*, which is dearer then Gold. Alſo Gold is got out of the ſaid Stone. And even this Stone alone doth teach us, that there is one common principle of Metals and Stones, as was ſaid before; and that the matter of Metals doth ſuffer many mutations, and that thence various Minerals may be generated, each of which hath a peculiar affinity to that Metal to the generation whereof the matter was diſpoſed: which I leave to the diligent conſideration of others.

Metals & Stones have the ſame common principles.

Lapis Armenus.

Lapis Armenus is in colour and Virtues of kin to the former. But this is not ſo hard as the *Lapis Lazuli*, nor is it adorned with ſpecks of Gold, but with many green, blew and blackiſh ſpecks.

Pearls.

Finally, let us conclude this our Doctrine of precious Stones with *Pearls*; which are not indeed generated in the Earth, as other Jewels are, yet are as precious and Noble as they.

Now they are bred in certain Shel-fiſh, of that Humor whereof the Shel of the ſaid Fiſh is made. The moſt excellent are found in the Perſian Sea, and in the Regions of *China* and the *Eaſt Indies*: the occidental Pearls becauſe they have not the Silver glance of the other are of leſs value. Now Pearls have a rare faculty to ſtrengthen a Man, and to reſtore his Spirits; and therefore they reſiſt Poyſon, Putrefaction and Peſtilential Feavers, they chear the mind, they are a Remedy for ſwooning, and Melancholick Diſeaſes. They are good againſt a flux of Blood and looſneſs of the Belly, they do ſtrengthen the Brain and Nerves. Mixt with Eye-ſalves they ſcour away the Clouds and Filth of the Eyes, and conſume the dropping moiſture thereof.

But ſo much may ſuffice to have ſpoken in brief of Stones and Jewels. You may ſee more in thoſe Authors who have wrote peculiarly of this ſubject, as *Franciſcus Rueus*, *Georgius Agricola*, *John Kentmannus*, *Andreas Baccius*, and eſpecially *Boetius*, who has publiſhed an excellent Hiſtory of Stones.

CHAP.

Chap. 5. *Of Metals.*

The Aristoteleans opinion concerning the matter of Metals.

NOw concerning the generation of Metals the opinion of Authors is various. And as to the matter of Metals, the Aristoteleans do hold that as all other things digged out of the Earth are made of a Smoaky exhalation, so all metals do spring from a vaporous Exhalation, and that moisture is prevalent in them, because they may be Melted and Hammered. And they teach that Metals are generated, when a Subterraneal Vapor included, especially in Stones, in regard of a dry Exhalation which drew it upward, is gathered into one, and Coagulated like Dew into very smal drops, which cannot be done without cold: yet with this difference; that in the Generation of Dew and Hoar-frost the foresaid driness which carried the Vapor upwards is separated: but in the generation of Metals that same separation is not made, but the dry Exhalation is contained and Coagulated with the Vapor.

Howbeit, this opinion is not to be received unless it be otherwise explained. For it supposes a matter too remote, and speakes of the generation of Metals, as if it spake of Meteors. And those who hold thus concerning the Generation of Metals, seem to be of his mind, who intending to speak of the Generation of Animals, should make, not Blood and Seed, but an Exhalation Dry or Moist, the principle of Living-Creatures.

The opinion of the Chymists.

The Chymists therefore do better, who having more diligently sought into the Generation and Resolution of Metals, hold their principles to be Sulphur and Mercury; to which later writers have, not without Cause, added Salt, or a Metalline, Copperasated, or Vitriolated Earth: and that in all these a Formative and Seminal Faculty was at the Creation implanted by God the Creator; which as *Scaliger* *Exercit.* 307. *Sect.* 20. is a certain fift essence far different from the four Elements, and which as the principal agent makes Metals of matter thereto disposed. And therefore wherever this Seminal Principle is wanting, no Metal can be made of any Exhalation, Dry or Moist, by the power of any efficient whatsoever.

And that the Matter thus stands, is apparent from the Metal mines, the meltings, Probations, and resolutions of Metals, and the very Proprieties of the Metals them-selves. For in all Mines these principles are found, and out of all the Oare where-in all Metals are Generated, Sulphur is boiled. Also 'tis very well known to Chymists, that Metals may be changed into running Quick-Silver, and that of Quick-Silver Metals may be made. Yea any man may judg by his Nose and Eyes, that there is Sulphur in metals; because in the Calcinations and melting down of Copper and Iron, a greenish and reddish flame is seen, and there is a smel of Brim-stone. And most Diseases wherewith diggers and refiners of Metals are troubled, have their original from Sulphur and Mercury. The Resolution or Dissolving of Metals shews the same, which is not into Dry and moist Exhalations only, but into things of kin to Metals, retaining their own Nature and properties, in sundry alterations and external Mutations. For Lead being turned into Cerus, although it seem to have quite put off its Nature, yet may it be melted into Lead again. Yea and *Stibium* doth turn again to Antimony without much ado. The specifical proprieties of Metals do argue the same, which witness, that they have not their original only from the mixture of Elements. For that which is true of the Load-stone, as *Scaliger* writes, that it cannot by any faculty of the Elements draw Iron: the same may be said of many proprieties and operations of Metals.

And the Mercurial matter is the chiefest in the Constitution of Elements; which being sundry waies mixed with fixt or volatile Sulphur, and a copperasated Salt or Earth, makes sundry sorts of Metals. And the Chymists do commonly call Mercury the Mother and Feminine Principle, and Sulphur the Father and Masculine principle. Now with Sulphur is mingled Vitriol or Metallick Salt; and in Sulphur there is Vitriol, and in al Vitriol, Sulphur: whence it happens, that out of both there is a Spirit drawn much alike.

But

But that others do think otherwise in this point, the chief cause is; inasmuch as these principles are not alwaies found in mines after the same likeness and form as they imagined. Moreover, because metals are not found every where and in all places in which Quick-Silver and Sulphur are found. And Finally, because they cannot sufficiently discerne these principles in Metals. For they think it necessary, that in every Mine of Metal these principles should be found with the Metals, but especially that Metals ought alwaies to be found in the Veins of Mercury and Sulphur: and if Sulphur were in Metals they conceive it must needs flame.

But unless they were blinded with the darkness of Chymical Ignorance they might easily see those principles in Metallick Veins. For they do not alwaies appear under one and the same visible form and shape; though sometimes they are found in the mines, in the very same shape: but sometimes they wander in the shapes of Exhalations and Spirits, sometimes they are Coagulated into the form of a Juyce, an Earth, or some other form. Yea, and the Metals themselves are found sometimes Fixed, other whiles Volatil. For Nature Generates Mercury after a Spiritual manner; to which if a Copperasated Sulphur be added, and a formative principle, it is Coagulated into a Metal. But if Sulphur and the formative Principle be wanting, it grows together into a peculiar matter and is found alone. For one of these doth not suffice to make a Metal, but all of them are requisite. And therefore in such Mines, in which one is present and the rest are wanting, Metals are not generated. But there alone Metals are bred, where a Sulphureous Vitriolated fixative Spirit is exactly mixed with Quick-Silver in a matter fit to become a Metal. Those Bodies do not make Metals, but the Spirit must of necessity be mingled most intimately. But in this formation, before they grow quite firm and Dry, and come to Maturity, they are often found in the likness of a Mineral Juyce, and unripe Metal: and at last they are Coagulated and compacted into a perfect Metal.

And they that are stumbled at the inflameable Nature of Sulphur, must know, that there is no necessity that Metals must take flame because they have Sulphur in them. Simple Water Wets, but it doth not so in compounds; Air ascends upwards, but not in mixed Bodies. Again, they are ignorant that an inflamable and Volatile thing may so be fixed, that it shall take flame no more. For it is the property of all Sulphur to be inflamable, but not at all times: and the more it is fixed the less it conceives flame; and the more it is fixed, the less subject Metal is to burn. Hence it comes to pass, that Iron and Copper are burned, and send forth a notable flame: but Gold by reason of the fixedness of its Sulphur withstands the violence of Fire.

The efficient cause of Metals.

From hence also, it is easie to judg of the Efficient cause and active principle in the Generation of Metals. For they who conceive that Metals are Coagulated only by cold do discover their own simplicity of wit, or their unskilfulness in the point of Metals: seeing Metals have already an internal Cause of their Coagulation, and are dissolved by heat; cold only gives occasion of their Coagulation. But if that internal Cause of Coagulation be wanting, no external cold is sufficient to Coagulate the same. Which is to be seen in Quick-Silver, which no cold can congeal, and yet it is Coagulated with the Spirit of Lead. Yea, in the very Fire it self, by Cementations and other Coctions, Coagulation and fixation is made.

We ought therefore, touching the Nature and original of Metals, rather to credit the Diggers, Refiners, and Triars of Metals, and the Chymist, then idle disputers, Ignorant of the Nature of Metals, Who, out of an hatred to Chymistry, do endeavour (by I know not what Reason) to perswade us otherwise. And therefore the most learned also of the Peripateticks, who have searcht more deeply into the Nature of Metals, do in this point follow the opinion of the Chymists.

The Affections of Metals.

Now the Common Affections of Metals are, to be melted with heat; to grow hard again by cold; to be hammered and beaten out, to drink in Quick Silver; to be dissolved by *Aqua-Fortis*.

They flow and melt by Reason of Quick-Silver: and therefore those who have most part Quick-Silver are more easily Molten; but those more hardly, in which Sulphureous dryness and Salt are most prevalent. And if there be good store of

Mercury in Metals they become so soft, as to be melted by the very least heat; Contrariwise, such as are often burnt in the Fire, their Mercurial moisture being taken away, they become at last hardly Meltable; as also if they be steeped in Aluminous, Copperasated, and fixatory Waters.

Also malleableness depends upon the Mercurial Humidity. And those Metals may be best hammered and spred abroad by beating which have a Mercurial moisture most exactly mixed with a Sulphur proportionable. Contrariwise, those in which there is most of a Vitriolated Sulphur, of Salt and Metalline Earth, they are least Malleable.

Now Metals do drink in Quick-Silver, because they have one Root, and their substances are of kin; as we see Oyls easily mix'd with Oyly things, and Water with things Watry.

Difference of Metals. Metals are by others otherwise divided: but they are by the Chymists usually divided into Perfect and Imperfect. And they count that perfect which is compleat both in Substance and Accidents, and excellently fitted for use. Such an one (Namely) as hath a subtile Mercurial Substance, a most ponderous Nature; that endures the Fire and all the trials thereof, without even the very least detriment; it is easily joyned with Mercury, and most easily and largly dilated. Al which marks, since they are most to be found in Gold, it is by the consent of al Nations reputed the most excellent and perfect Metal. Whereof nevertheless you may read what *Mirandulanus* saies, in his *Book de Auro*.

Whether Metals differ specifically or not. Now a Question is here raised, whether Metals differ specifically, or not. Very many Chymists hold, that they do not specifically differ, but only in degrees of perfection, and that they consist all of the same matter; have the same efficient Cause; are generated in the same place: that in Lead there is alwaies some Gold found; in some Brass there is Gold; and divers of them are commonly bred together; they are mutually changed one into another, as Iron into Copper; out of all Vitriol is made, and all are resolved into Mercury. Hence doubtless were these sayings of the Chymists: *Lead is Leprous Gold*: *the Inner parts of Silver are Gold.*

Yet, If I may speak mine own opinion, I conceive that Metals are specifically different. For though it may rightly be said that al have one and the same matter, not only generical and remote, but also immediate (in which respect they differ from other Natural things, and for which cause it is that they are turned one into another, and divers generated at once in the same place) yet have they not the same Ultimate matter; but therein they differ. Yet neither are they differenced only by accidents, but by a substantial specifick form, and there is one form of Gold, another of Iron, and another of Lead, which disposes and Labours that common matter according to its own Nature, which appears by the effects and operations. Hence it is, that though all of them are resolved into vitriol and Mercury; yet that Vitriol which is made out of Copper differs not a little from that made out of Iron.

Nor is that of any moment which some Chymists say; that Nature alwaies intends that which is most perfect. For this is true in every kind. In the kind of Men, Nature intends to make the perfectest man; in the kind of a Vine, the most perfect Vine; in the kind of Gold, the most perfect Gold. Yet doth it not therefore follow that because Gold is the perfectest Metal therefore Nature alwaies intends to make Gold. For that is just as if a Man should say, that Nature in the kind of Animals alwaies intended a Man, who is the most perfect of al Live-Creatures. And if Nature alwaies intended Gold, why is there no more to be found? Now they hold that there are two perfect Metals, Gold and Silver: and four imperfect ones.

Gold what it is? Gold is the most perfect of all Metals, consisting of the most pure Mercury, most perfectly digested and ripened, by Virtue of a most excellent and fixed ruddy Sulphur, wherewith it is most exactly mixed and united. Hence it comes to have a yellow colour; it is most weighty of al Metals, it indures the Fire, it may be beaten out exceedingly thin. and it is most easily of all Metals united to Mercury. The Chymists do call it *Sol*, the Sun.

Silver, what? Silver is a perfect Metal, yet more inferior then Gold, consisting of a Mercury almost

almoſt fixed, and of a white Sulphur, almoſt fixed alſo. For it is neither ſo heavy nor ſo fixed as Gold. And therefore although it endures the Fire after a ſort, and abides in the Aſhy Cement, yet doth it not endure in the Royal Cement, Antimony, Sulphur. Next to Gold it is beaten to the greateſt thinneſs of any Metal. The Chymiſts call it *Luna*, the Moon.

Imperfect Metals are thoſe which have principles not ſo mature and wel digeſted, nor ſo fixed and pure: whence it happens, they can neither endure the thunder of Lead. nor the Cement, nor Sulphur, but flie away in ſmoak and ſparkles, or are changed into droſs, Glaſs, Stones.

Now they are hard or ſoft. The hard are thoſe which by Reaſon of their Earthy Sulphur and hardned Mercury are firſt red hot before they melt; the ſoft are thoſe which by Reaſon of a moiſter Mercury and leſs digeſted are firſt melted before they are Red Hot. The hard have more Sulphur then the ſoft; but it is Earthy and contains more vitriolated Juyce. And therefore they are eaſily turned into Vitriol. Hence it comes to paſs, that they ſuffer detriment by Fire, and will not endure the tryal of more perfect Metals, but Fly into the Air.

Now the hard Metals are two, Braſs or Copper, and Iron. Braſs is an imperfect Metal, Hard, conſiſting of a little Mercury and very much impure Red Sulphur, not perfectly ripened, for the moſt part but yet not perfectly fixed; being of a reddiſh colour. And hence, by reaſon of its Sulphur, it is thought to have affinity with Gold, and to contain in it the principles and Seeds of Gold; and it is believed that by digeſtion it may attain to ſome maturity and perfection. Alſo it hath affinity to Silver; ſeeing in the Marchaſite and the *Lapis Fiſſilis* they are oftentimes found both together: and Silver and Copper being diſſolved are both of a blew colour. The Chymiſts cal it *Venus*. *Braſs or Copper.*

Iron is an imperfect Metal, conſiſting of a little Mercury and much fixed Sulphur, being of a whitiſh black and Blew colour. Hence it comes to paſs, that it is exceeding ſlow in melting, and bears long the force of Fire; and is readily calcined. Alſo it is hardly Joyned with Mercury, becauſe there is little Mercury in it. Alſo it hath little Vitriol, and therefore it is of a whitiſh livid colour. The Chymiſts cal it *Mars*. *Iron.*

The ſoft Metals are, white Lead which is called Tinn; and Black-Lead which is called ſimply Lead.

Tinn or white Lead, is an imperfect Metal, ſoft and white, conſiſting of much Mercury, leſs pure and fixed then in the perfect Metals, but purer and more fixed then in Black-Lead, and of a white impure and unripe Sulphur. Being mixed with Gold and Lead it leaves them malleable; but being mingled with the other Metals it makes them break under the Hammer. The Chymiſts call it *Jupiter*. *Tinn.*

Black-Lead is an imperfect Metal, Soft, of a livid colour, generated of much impure and undigeſted Mercury, and of a little Sulphur impure likewiſe and ſtinking. Hence, being uſed in the trial of perfected Metals it conſumes the imperfect, and carries them away with it ſelf in Smoak, or turns them into droſs. It is of all Metals the moſt eaſily melted. The Chymiſts cal it *Saturn*. *Lead.*

Finally, Of kin to Metals is Quick-ſilver, a Mineral Liquor, of a wonderful Nature, for it flows like Water, and yet it wets not. It is the weightieſt of all Minerals, and wil ſuffer nothing to ſink into it but Gold. Now it conſiſts of a clammy Metallick Water, and a Sulphureous Earth, exactly mingled; and it mingles with Metals, firſt with Gold, then with Tinn, then with Lead, then with Silver; hardly with Copper and Iron. The Chymiſts call it Mercury; becauſe as Mercury aſſociates himſelf with all the Planets, ſo doth Quick-ſilver with all Metals; and becauſe its Nature is moveable and ſhifting, which hath hitherto ſufficiently exerciſed many Chymiſts, and is not yet ſufficiently underſtood. And therefore hardly can we ſay any thing thereof in this brief diſcourſe. *Quick-Silver.*

And here to conclude our Diſcourſe of Metals, we muſt not paſs over that controverſie concerning the tranſmutation of Metals. Out of which briefly to unwind our ſelves, ſeeing, as *Ariſtotle* rightly judges, it is a certain weakneſs of mind to ſeek *Whether the Tranſmutation of Metals be poſſible.*

seek for Reasons and let go Sense; I conceive the shallow Reasons of some Persons unskilful in Chymistry are no waies to be preferred before experience. Now it is a most known thing, that in *Hungaria*, at a Town called *Smolnits*, in the Mountain *Carpathus*, there is a Fountain, whereinto Iron being cast is turned into very good Copper. The like is done at this day in *Goslaria*. Nor is this performed by Natural Waters only, but the same may be done by Art also. For if Iron be cast into vitriolated Water there sticks a red pouder thereto, which being melted in the Fire becomes Copper. So Quick-Silver is turned into Lead, with no great pains. Also it hath been often found true by experience, in this Age of ours, that other Metals may be turned into Gold: and it is Notoriously known, what that famous *Alexander Sidon*, a Scotchman performed at *Colenius Basil*, and others places. Concerning which matter see the Historis of the Metallick Transmutation described by *Ewaldus de Hoghelande*; and the writings published by *Andreas Libavius*, for defence of Transmutatory Alchymy.

Since therefore by Experience it is sufficiently manifest; we need not dispute long of this Matter. One thing we shal briefly hint. That the Transmutation of Metals is not Simply and Barely Artificial, save as it applies things Natural to perform some certain action. Nor doth the Art proceed upon any but meerly Natural principles; and such things as Nature hath generated she doth only mix after a certain Fashion.

THE

THE SIXTH BOOK.

Of the Soul in General, and of things Vegetable.

Chap. 1. *Of the Soul in General.*

whether there be a Soul or no?

SInce Method requires that we should now treat of Living and Animal Things; we must first speak of the Soul. That there is such a thing as a Soul, is manifest by the operations thereof. For we see that Living things perform many operations which they cannot do when they are dead. It follows therefore that the Body it self cannot be the cause of those operations; but that there is somwhat in the Body which performs the same. Now since every operation is a kind of transient accident, never firmly subsisting in it self; there must needs be in the Body some cause, which is the stable and constant producer of actions; which being present, life and every action is performed, and when it departs, the life ceaseth: and this cause of such like actions is termed *Anima*, the Soul.

As to what concerns the Essence of the Soul, I omit the sundry Opinions of the Ancients, which are reckoned up, and largely refuted by *Aristotle*, *Lib.* 1. *de Anima*. Marsilius Ficinus, *Lib.* 6. 7. 8. *Theologiæ Platonicæ*. And I shal retain the Definition of *Aristotle* in 2. *de Anima*, *c.* 1. *text.* 6. which is this, *A Soul is the first act and perfection of a Natural Body, which hath an aptitude to Life*; or briefly, *of a Natural Body, whose parts are Organs*. For the Soul is neither an accident, (seeing an accident cannot be one part of a compounded substance, such as a living Body is, nor the first principle of all actions, or make a true difference betwixt two substances;) nor a Body, for two Bodies cannot be in one place: But it is the act, or substantial form, by which a living Body is a living Body indeed; that is to say, by which it hath an inbred power and faculty to perform all the actions of Life. More may be seen touching the word *Entelecheia* used in this Definition, in Book 1. ch. 9. concerning Motion, where I have at large explained the genuine signification of this Word.

The Definition of the Soul.

The Soul is neither an accident, nor a body.

Now a Soul is not the perfection and form of any Body, not of an Artificial, but a Natural Body; nor yet of every Natural Body: For every Natural Body is not animated; but that Body only, which hath an aptitude to exercise the actions of Life, and is so disposed that the Soul may thereby, as by Instruments, exercise its actions. For here we must hold out of *Aristotle*, in 2 *Metaphys. com.* 31. That the action of an Agent does not proceed from the subject without a form, nor from the form without a subject: for otherwise the subject and its form would be actually two things. Now if so be action cannot be performed by a subject without a form, nor by a form without a subject, much less can it be performed by Instruments without a Working cause. From whence it follows, that Action is performed by a certain compound of Matter, Form, and Instruments; so that the whol Compound may be called the Principle which acts; but the Form, the Principle wherewith the act is performed, because the Compound acts by vertue of the Form; Finally, the Instruments, whereby; seeing the operation is performed through their subserviency.

Moreover, There is also another Definition of the Soul in *Aristotle*, in 2. *de Anima*, *cap.* 2. *text.* 18. which is this: *Our Soul is the Principle whereby we live, move, use our Senses, and understand.*

Another definition of the Soul.

And seeing there are many kinds of Living Creatures; we shal best come to the knowledg of their Differences, by observation of the effects and operations of the Soul; since every

cause discovers it self by its effects, and the form by its operations. Now the proper Energy of the Soul is Life, which as the second act, is evermore attended upon, and companion to the Soul as the first act. We may therefore from the distinct manners of Life constitute the distinct sorts of souls and animated things. Now a man lives, and so do other Creatures, and so do Plants, but each of these after a peculiar fashion. The life of Plants consists in Nutrition only, and the action proper to each one, but Plants have no Senses: the life of Brutes, besides Nutrition and action, contains also sense; and each sort of Bruits hath its proper action: Finally, Man besides al these, does also understand, and make use of Reason.

Three distinct sorts of Souls. There are therefore three distinct sorts of Souls: all which are in Matter, and do constitute a living Body: Yet one of them is more loose from the matter, but another more plunged therein; and one can receive the spiritual and immaterial species of things, wherein consists the force of knowledg, but some cannot. Plants are nourished, and understand nothing; Bruit Animals can understand some things; they receive immaterial species, howbeit with some conditions of the matter: For what things they perceive are here present, and at this time; seeing Sense is busied about particulars. But the rational Soul receives immaterial species or representations of things, even without all conditions of matter.

Whether the Faculties of the Soul differ therefrom, and how? And seeing the soul is the cause of various actions, and hath the power to perform sundry operations in living Creatures, we must consider how the powers or faculties of the Soul are related to the Soul it self. And here some hold, that the faculties of the Soul are the very Essence thereof, which according to the sundry actions whereof it is the cause, hath sundry names: others contrarywise do conceive that the faculties and powers of the soul, as all others, are qualities of the second sort, and that they are really and essentially different from the soul. And this latter Opinion is the better of the two. For the Powers and Faculties of the Soul are indeed only properties and inseparable accidents thereof, and essentially distinct therefrom. For the Soul is a substance, but these are accidents or aptitudes and propensions to operate; which flow from the essence of the Soul, as their first cause, only by emanation, and so depend thereon, and are received without any medium, in the same animated Body, wherein the Soul is. For every power is ranked amongst the second sort of Qualities: and seeing the Powers of the Soul themselves are distinct one from another, they must also differ essentially from the Soul: For if they were the same with it, they would be the same one with another. Howbeit, it is to be observed, that the faculties are not mediate Agents, or middle causes betwixt the Soul and its operations, but only conditions and aptitudes to operate: For operations proceed from the Act, and not from the power; nor is it necessary that betwixt every agent and its operation there should intercede some middle agent. For so, neither could that middle agent be the cause of action, without another middle agent: and so there should a progress *ad infinitum*, without end.

These divers Souls are with their faculties so disposed, that the upper faculty does alwaies pre-suppose the lower: but the inferior may be without the superior. The Vegetative is without the sensitive in Plants: the Vegetative and Sensitive are without the Rational in Bruits: in Man all three concur. But how the Faculties are disposed in reference to the Soul in divers sorts of Living Creatures, intricate and hard Questions are agitated amongst Phylosophers.

Whether in one living thing there is more than one Soul. For in the first place Enquiry is made, Whether in every living thing there is only one Soul, or more. For some teach, That in every living Creature there is only one Soul, and that it is furnished with all the faculties of an inferior Soul; and that there are not in Man three souls, an Intelligent, a Sensitive, and a Vegetative; but one that is endued with the powers of all three, and takes its denomination from the nobler faculty: and that so the faculties which are in living Creatures of the same sort, do proceed from one sort of Soul; but those which are in living Creatures of a several sort, do arise also from a several sort of Soul; although both here and there they have the same names, and are attended by the same operations. Others do hold contrarily; That there are distinct Souls, not only in living things of several sorts; but that more also may be found in the same living Creature; and that in Man there is not only a nutritive and sensitive Faculty, but a nutritive and sensitive Soul, and also a rational; and that where-ever the Faculty is, there is also the Soul, to which it primarily belongs.

And although both Opinions have learned and famous Defenders; yet the first which is the commoner and most received, seems to me the more probable. For since there is one specifick Essence, and consequently one only Form of every thing; therefore the Soul of every living thing, which is the Form, and principally constitutes the Essence thereof, can be but one. Moreover, it is not possible, that the principles of things, opposite one to another,

ther, and ſeveral ſorts of Souls can meet together, without uniting or confounding the Eſſences of things; or yet be ſubordinate one to another; ſeeing they are ſuch oppoſites as Logicians call *Diſparata*, and do exclude one another out of the ſame ſubject. Moreover, it is a needleſs thing to multiply ſouls; ſince one ſoul, furniſhed with divers faculties may produce all the degrees of life; and a ſoul of an higher degree, and more noble, does include the faculties of the more ignoble and inferior; juſt as the number Four includes the number Three: nor is it neceſſary, though there are in the underſtanding ſubordinate conceptions, by reaſon of ſubordinate differences, that there ſhould therefore be ſubordinate Forms, without the Underſtanding. For the multiplicity of univerſal ſubordinate conceptions does not multiply the Eſſence and Form of a thing.

Now the Principal Cauſe that others have erred in this point, hath been this; That they thought the vegetative power alone to be a peculiar Soul, and to conſtitute the ſort of a Plant; and the ſenſitive Faculty alſo to be a peculiar Soul which conſtituted the ſort of Animal: Whereas nevertheleſs there are many ſorts both of Plants and Animals; and the Plants have different ſorts amongſt them, as alſo the Animals, and there is one ſpecifical form of a Roſe, another of a Violet, another of a Willow; though the vegetative Faculty be found in all of them: one of a Lyon, another of a Dog, another of a Wolf, although the ſenſitive Faculty be common to all. All Plants have indeed a nutritive and generative Faculty, but not that only, but withal ſomwhat proper, whereby a Violet differs from a Roſe and a Willow. So a Wolf is nouriſhed, does generate, and exerciſes its ſenſes, but it does not theſe things alone, but it hath alſo ſomwhat proper to it ſelf, whereby it differs from a Lyon and a Dog; and from the ſame ſoul in a Dog does flow the Faculty of nouriſhing, of ſenſe, and of doing that which is proper to a Dog, whereby it differs from other Animals. Nor are there in a Dog many and divers Eſſences, as the Patrons of the other Opinion do erroneouſly ſuppoſe. For neither are the Vegetative and Senſitive, or the Vegetative, Senſitive, and Rational, certain peculiar general Forms, or three Eſſences; but only general conceptions, ariſing, and conſtituted out of the compariſon and conveniency of Living things, which do no where exiſt ſeparately ſave in the mind; juſt as Beeing, Subſtance, Body: and therefore they do not multiply the Eſſence of things.

Whether the ſoul be totally in the whol Body, and totally in every part.

After this Queſtion follows another: Whether the Soul be totally in the whol Body, and totally in every part? or whether it be all in the whol Body, and part of it in one part, and part in another. But firſt that ambiguity which lurks in this Queſtion, muſt be diſtinguiſhed: For the term *Whol*, may here be conſidered in a three-fold notion; in reſpect of a Subſtance, Quantity, and Quality. The firſt is conſtituted of the parts of the Soul in the ſame living Creature; the ſecond of the Subject, according to the extenſion whereof the Soul is extended, ſo as to have quantity; the third of the faculties, wherewith it is furniſhed. The School-men call the firſt, the Eſſential whol; the ſecond, the Quantitative whol; the third, the Poteſtative whol.

As to the firſt, Inaſmuch as the ſoul of every thing is ſimple, and not compounded of Eſſential parts, where ever it is, there it is totally, and ſo as that it is totally in the whol Body. For we muſt not allow of their Opinion, who hold, That the ſubſtance of the Soul is only in one part of the Body, which is the principal part; and that the reſt of the Body is governed by powers ſhed out of the Soul: For thus the whol Body ſhould not be animated, but only that part wherein the ſubſtance of the Soul is: For thoſe Faculties whereby (according to their Opinion) the reſt of the Members are governed, ſince they are accidents, cannot ſupply the room of a ſubſtantial Form. Moreover, ſince the Faculties are accidents, flowing from the Eſſence of the Soul, only by way of emanation, they cannot have a ſubject different from their Form, nor be produced in any ſubject, ſave that wherein the Soul is; and therefore where they are, there we may know the eſſence of the Soul to be. And therefore we conclude that the Eſſence of the Soul is in all parts of the animated Body, and that no part is deſtitute thereof.

Yet is not the Soul in its Body, in all animate things, after one and the ſame manner. For in Plants and ſome Animals, there is no principal Member, but inſtead of a principal Member, a certain humor is diffuſed through the whol Body, by means of which, chiefly, the ſoul is joyned to the Body: whence it is, that alſo the parts being pluckt from the Body do live for a ſeaſon. But the caſe is otherwiſe in perfect Animals, in which we muſt hold that there is ſome principal Member, wherein the ſoul, as in a Root wherein it is naturally inbred as it were, may reſide, and pour it ſelf out to the other Members. And therefore that principal Member being hurt, the Animal ſoon dies; but not if any other be hurt; and the Members pluckt from the Body, do preſently die.

Secondly, If we enquire how the Soul is in the Body, in respect of Extension and Quantity, the Answer is briefly this: That every form which informs the matter and is united thereto, and makes up one compound therewith, is extended according to the extension of the Matter. Concerning which thing it is nevertheless to be observed, that only Matter is of it self furnished with Quantity, and divisible; but that the Soul of it self is neither subject to Quantitity, nor to Division. In the mean while, because it informs the whol Body, it is rightly said to be coextended therewith, and that where ever the body is that lives, there also the Soul is. Hence the Body is properly said to be divided, and to be made greater or lesser; and the Body of a Plant, from a smal Twig, grows to a tall Tree, a Calf to an Ox; and a Body in a Consumption grows less, and so doth a Tree whose boughs are cut off. But it is not so with the Soul; nor is that Soul which is in a smal branch, less in it self, than the Soul which is in a tall Tree; nor is the Soul of a Calf less than the Soul of an Ox, but remaining the same, it spreads it self abroad into the additional nutriment; nor is a Plant or Animal the less by communicating it self in generation; nor when the branches of a Tree are cut off, is the Soul of the Tree the lesser; nor hath an Animal that is consumed a lesser Soul than that which is corpulent. For the Soul is joyned to the dimensions, partly as colors, partly after another manner. For it informs the measured quantitative Body, and its plenitude and fillingness is as great as the Body it self and the dimension thereof. Aud though we suppose the Body to encrease never so much, the Soul without any addition wil fil it al; and if it be diminished never so much, it wil fil no more than that little Body. Of it self therefore the Soul hath no Quantity: but in respect of dimensions whereto it is joyned, it hath such a property, that it fils no more than the Body, be it great or little. And though notwithstanding by accident its plenitude is restrained and contained: yet is it not cut in sunder or diminished. In which particular it affords a certain resemblance of the most good and great God, who as *J. Cæsar Scaliger* speaks, Reigns every where without place, is all without all, and the whol without parts.

Finally, Since divers and sundry powers do flow from the Soul; the Question is whether the Soul have all these powers together, in al the parts of the Body. We answer: That in al the parts of the Body, there are al the faculties according to their Original; and that the Soul brings al its faculties into al parts of the Body: yet peculiar faculties are only received in peculiar parts as in their subjects. For the Soul indeed is in al the parts, which is the Original of al the faculties: yet such is the nature of proper accidents, that it exists from a principle or certain cause; yet they insist only in a certain Subject. Hence *Scaliger Exercit.* 103. *s.* 37. *You shal see some doubt, whether Memory be in all parts of the Body. Nay I tel thee, the Understanding is in the Feet. For we have one Soul every where attended with its faculties, as being essential thereunto. But where there are Instruments, there the faculty exercises its act. For if there were an Eye in the Finger, the Finger would see by that Eye, without calling any power or faculty from the Brain.* For the Soul which is the same in al parts of the Body, is indeed every where furnished with the same faculties; and hath in al members the power to do whatsoever is proper to it; yet it performs certain actions by certain instruments; it sees by the Eye, hears by the Ears, smels by the Nostrils.

Which is the Principal part of the Body.

But because we are fallen upon mention of the principal part, and the foregoing Question can scarce be rightly resolved, without explication of the Controversie concerning the principal member in man and other sanguine Creatures, we must not omit to handle the same. For it is one and the same Question, which is the Seat of the Soul, and which is the principal member. For the principality is to be assigned to that member wherein the soul doth chiefly reside. Now that there is one principal member Phylosophers and Physitians agree, though they contend sharply which it is: and reason perswades the same. For since the soul is not the form of an homogeneal body, but of a body heterogeneal and organical, which hath many and different parts: there must of necessity be some order established amongst them, and we must beleeve that one of them is more worthy than another: and since as hath been said, the Hand, Foot, and other members being cut off, die presently, the rest retaining life, we must needs think that the Soul hath more affinity to one than another. But what that principal member is, the Platonists, to whom *Galen* and many Physitians joyn, are at variance with the Aristotelians or Peripateticks.

Plato and *Galen* hold three chief Parts, the Liver, Heart and Brain, and they assign the principality to the Brain, because therein is the principle of Sense and motion, and the rational soul hath there its residence. Contrariwise, the Peripateticks hold the Heart to be the principal member.

But

But several men seem to have several respects in their assigning the principal part. *Galen* hath respect to the nobility of the actions; but the Aristotelians respect the Radication (that I may so speak) of the Soul it self. The Physitians count the animal faculties, so called, most noble; the Peripateticks make most account of the Action of the Heart, because thereby all the rest are cherished and governed. And therefore though we may grant Physitians, that there are three chief members of the Body: Yet if question be made touching the principality, and the radication of the soul, since there is only one soul in every Animal, not many, and one Animal hath only one soul and specifick form; we must hold there is one principal member, wherein it resides, as in its Castle: although it perform not all its actions therein, but act definitly and distinctly in the organs proper and ordained to every distinct action.

Now if you shal ask me which is this member, I do with the Peripateticks assign the principality to the Heart, and hold that the soul doth stick therein as in its root, from whence it is diffused into all the rest of the members. Yea and the holy Scriptures ascribe not only the radication of the Soul to the Heart, but certain other actions also which most men attribute unto the Brain. And indeed this is a very ancient opinion; *Plato* (saith *Scaliger* in his 1. Book *de Plantis*) learned these things of the wise men of *Egypt*, the Egyptians learn'd them of the Chaldæans, out of whose decrees all exact literature hath flowed. For the Chaldæans placed the Principles of all our motions in the Heart, as in their principle. *The Heart is the Principal part.*

Now that the Heart is the Part wherein the Soul adheres as in its root, and therefore the principal part, is many waies apparent. For that is the principal member, not wherein as in the immediate Instrument, the most noble action is exercised; but that whereon the actions of al parts whether ignoble or noble, do depend, and whereby they are governed. For the prime Agent is more noble than the secondary and Instrumental Agent. Hence that Argument of *Galen* is invalid, who thus concludes; that is the Principle, from whence the Nerves, Veins, and Arteries arise. For that member seems to be the fountain and seat of the faculty, from which the Instruments arise. But these three kind of Vessels have their original from three members; the Veins from the Liver, the Arteries from the Heart, the Nerves from the Brain. And therefore there are three chief members, and the most excellent is the Brain. For we must distinguish betwixt the prime and chief principle of any operation, and the instrumental or secondary principle. For that which is the immediate Principle of an action, is not alwaies the first and most excellent. The immediate principle of sense and motion is the Brain: but yet the soul is not rooted therein.

Nor is that Argument of greater moment, that when the Brain is hurt, the operations of the sensitive Soul are hurt; to which therefore for the same cause medicaments are applied. For the first Agent cannot act without Instruments. And therefore when they are hurt, the action is taken away. And therefore, though the Heart which is the immediate Agent be wel, if the Brain which is the immediate Agent be hurt, the action is abolished: after the same manner, the Hand being hurt, although the Brain be wel, a man cannot handle or hold a thing; because the immediate Instrument of handling is hurt.

That therefore must be held to be the principal member, which governs all the actions of the whol Body; which breeds the common and most familiar Instrument of the whol Soul, *viz.* the spirits, but that is the Heart: which besides other tokens, is manifest from swooning fits, in which sense and Motion, and all the actions in the body are taken away, through want of spirits which should flow from the heart.

Moreover, that is the principal Member, according to the unity or plurality whereof there comes to be one or more Animals. For because an Animal by means of one soul is one; by means of two, two; that member by the doubling whereof the Animal becomes double, must needs be held the seat of the Soul. Now that the Heart is such a member *Aristotle* tels us, *Lib.* 4. *de Gener. Animal. cap.* 4. and that truly. For experience doth teach us, that by multiplication not of the Brain but Heart, an Animal hath been made double. I wil produce some Instances collected by *Schenkius, observat. Med. P.* 1. *Obs.* 10. In a certain Town called *Emaus*, in the raign of the Emperor *Theodosius*, a Boy was born, who to the navel was perfect, but above he was divided into two, had two breasts, two Heads with their parts and Sences. For somtimes one part would eat, and the other would abstain, one would sleep, the other wake, somtimes they would play together, laugh and weep, and beat one another. Now they lived neer upon two years. Afterwards it fel out that when one of them died, the other that remained alive died by reason of the putrefaction communicated from the other. Again, in the yeer 1531. there was one born, and grew to the stature of

of a perfect man, who had only two Heads and two Shoulders, so that one Head stood behind the other, and they were wonderfully like in favor, their Eyes and Beards were alike. They had the same appetite to meat, were hungry at the same time, had the same voyce, and both Heads had the same desire to the Wife which he had, and to evacuations. From which Stories it is apparent, that in the first who had a double Heart, all the Animal actions were doubled, but in the other, though there were two Heads, yet the actions were single, and that therefore the Principality belongs to the Heart. For if Sense, Motion, and other animal actions depend primarily on the Brain, and not on the Heart, why were those actions double only in the former, in whom besides the Brain there were two hearts; and not in the latter, in whom there were only two Heads?

Chap. 2. *Of the vegetative Soul.*

HAving spoken thus much of the Soul in general, it remains now that we treat of the sorts of Souls. And because the vegetative Soul is common to all living Creatures, we will begin with the consideration thereof. Now the vegetative Soul is the act or perfection of an organick body, whereby it lives, is nourished, encreases, and begets it like. There are belonging to this Soul three faculties: the nourishing, growing, and ingendring faculty. The nourishing faculty tends to preserve the Individual or particular living thing; the growing faculty tends to encrease the Quantity thereof; the Generative preserves the kind or sort. For the nutritive or nourishing faculty is that which turns the food into the substance of the living Body. For since the parts of a living Body are consumed by the native heat, (left if there should be a continued resolution, the Creature should perish) the nourishing faculty was bestowed thereupon, to repair that which is consumed. Now this Interchange of resolution and nutrition, lasts as long as the life: *for a living Creature is nourished as long it lives.* Aristot. 1. *de Gen. et Corrup. cap.* 5. *t.* 41.

The definition of the vegetative soul

The three faculties thereof.

The nutritive faculty.

Now to Nutrition three things are necessary, as *Aristotle* teaches 2. *de Anim. cap.* 4. *t.* 49. *The thing nourished, that wherewith it is nourished, and that which doth nourish: now that which nourishes is primarily the Soul, that which is nourished is the Body which contains it; that wherewith it is nourished, is the food.* Now *Zabarella* hath thus expressed the whol nature of nutrition, in *Lib. de Accret & nutrit. cap. ult.* Nutrition is the aggeneration of matter to the parts in a living Body, caused by the vegetative soul through help of natural heat, out of the food which is taken in; that the matter which is steamed away may be restored, and that the living Creature may be preserved, to the end of the term appointed by nature. *Scaliger* thus briefly defines it: Nutrition is a natural union of the changed food.

Four faculties subservient to the nutritive.

The Principal faculties have other faculties subservient to them, which yet do not arise from the Principal. For one faculty doth not possess another: but they al depend upon, and proceed immediately from the Soul. The nutritive faculty hath four faculties subservient thereunto; the Attractive, Retentive, Concoctive, and Expulsive: others add the Separative, which severs things hurtful. The Attractive, is that which draws the food; the Retentive is that which retains it, til it be duly elaborated; the Concoctive, is that which alters it and makes it fit for the living Body: the Expulsive, is that which drives out superfluous matter, which is unfit for nourishment.

The Augmentative faculty.

The definition of augmentation.

Now in the first age, not only nutrition is made, but also augmentation, and the parts which are added to the living Creature are greater than those that are consumed by the natural heat. Now Augmentation or Growth, according to the definition of *Zabarella de accret. & nutrit. cap.* 25. is the motion of a living Body, whereby the whol Body and al the parts are at once extended according to al dimensions, so as to gain a greater quantity; caused by the Vegetative Soul through assistance of the natural heat from the food taken in, and converted into parts of the substaunce of the Body, greater than what hath been consumed; that the living Creature may attain to that greatness which it ought to have, that it may perform al the operations of Life. For Accretion or Growth differs not from Nutrition in the subiect thereof, matter out of which it is made, and the Efficient Cause. For the same subject is the living Body; the Matter out of which, the Food; the Efficient, the Soul: but they differ in their form and End.

For Nutrition is the ag-generation of aliment, and belongs rather to Generation than Motion: but the form of Growth is a motion of extension, to a greater Quantity of the whol Body

body and all its parts. The End also is different: For in Nutrition there is only the restauration of what is consumed; in growth there is an acquisition of more than is consumed. Hence *Aristotle*, 1. *de Generat. & cor. cap.* 5. *text.* 14. *Nutrition is the same thing with Accretion or Growth; but they differ respectively: For inasmuch as that which is joyned to the Body, is potentially so much flesh, it is able to encrease the body: but inasmuch as it is potentially bare flesh, so far it is able to nourish.*

The Conditions of Augmentation.

Now because there are many Augmentations improperly so called, it is worth our labor to observe out of *Aristotle*, *Lib.* 1. *de Generat. & corrupt. cap.* 5. *t.* 33. three conditions of Accretion or Growth properly so called, or three things necessary to Accretion. 1. *Not only the whol Body must become greater, but also every part thereof.* 2. *It ought to become greater, by means of some matter coming from without.* 3. *That which is augmented must continue the same thing in number which it was before.* In the first condition is explained the proper nature of Accretion. For though some doubt (since many mutations concur in Accretion, and not only the addition of Aliment, but also extension is necessary) in what mutation the nature thereof should consist: yet their Opinion is the truer, which joyn both these mutations together, and hold that Accretion or Growth consists both in the conversion of the matter of the Aliment into the substance of the living Creature, and also in the extension of the said Creature. For Growth is caused by somwhat coming to the body, and the thing grown hath changed its place, 1. *de Gener. & Cor. cap.* 5. *text.* 25.

Now, after what manner a greater quantity is acquired in a living Creature, Authors are also at variance; Some conceive it is done by driving, and that one part drives another, and another another, after the same manner as we see it is in the Nails and Hairs: But this is not agreeable to truth. They think more rightly, who beleeve that it is done by extension, viz. When the Aliment is extended through all the parts of the body, and through all the different postures of the said parts; which comes to pass when all the Pores are filled, which being full, the parts are extended: and all the parts being extended and augmented, the whol body is also encreased; after the same manner as we see a spunge grow great, after the water hath insinuated it self into all the parts thereof. Now according to the extension of the Body, the soul is also extended: and if any man will call it being so extended, greater, let him remember, that a Form of it self is neither great nor little. Hence *Scaliger*, Exercit. 101. Sect. 15. *The Form when it extends it self into the newly applied matter, it advances it self, but is not encreased: For it does not generate a new Form. And verily he that shall call a Form greater or lesser, will abuse the patience of wise men.*

Now living Creatures are not alwaies augmented, but only to a certain term of their age; the cause whereof is not in the soul: For neither it, nor its Faculties, which are proper to its Essence, are corrupted or weakened, but only the body. Nor is the cause in the natural heat; for that is as strong in a yong man, as in a boy. But the impediment is in the body; viz. the bones, which are the chief part that is augmented, and according to the encrease whereof the whol body is encreased, are more moist and soft in youth, and more apt to be extended; but in succeeding Ages they are so dried and hardened by the natural heat, that they become unapt to be extended. Although in some elderly persons the flesh and fat are many times augmented, yet that is no true growth, because the whol body is not augmented, but only the softer parts.

The generative faculty.

The definition of generation.

Finally, The generative Faculty is that which by the prolifick seed begets its like: And the Generation of a living Creature, as *Aristotle* defines it, *de Vita et Morte, cap.* 10. *Is the first participation of the Vegetative Soul with heat.* For living Creatures are said to beget their like, when they give out somwhat of their own matter, and their own form; which is then done when they yield their seed. *For in the seed there is both the matter and form of a Dog forth coming: Nor does the seed of a Dog differ from a Dog, otherwise than as aptitude from Act; and there is nothing added to the seed, but an expression of those Organs which were before confused,* saies *Scaliger* in Exercit. 268. and Exercit. 6. Sect. 5. and 7. *The form is in the Dogs seed, in the aptitude whereof it is said to be; because the seed is able and apt to give that form which it contains in it self; or because it wants the express Instruments, which afterward the Soul frames to it self, both by altering the whol, and disposing the parts, and is its self the builder of its own house.* And in the same Exercit. Sect. 10. *Therefore a Tree generates when it produces its seed. But a Tree is not then generated, when it sprouts up out of the seed; but then the generated Tree, which was before imperfect, becomes perfect. So a Dog does not ingender when the whelp is brought forth, but when he ingenders seed: Because in the very act of copulation many have died, before the*

the seed received any disposition or qualification in the Womb. Which we see more evidently in Plants: For the Almond Tree being dead, a planted Almond taken therefrom grows up to a Tree. Now the Soul engenders a Soul by promotion of it self; after the same manner truly, as in growing it insinuates it self into the new matter of the nourishment.

Now Living Creatures obtained this Faculty of propagating their kind, from their first Creation by God, when he blessed all living Creatures, saying, *Encrease and multiply*; and again, *Let the Earth bring forth Grass, the Herb yielding seed, and the fruit Tree yielding fruit, whose seed is in it self, upon the Earth*: and again, *Let the Waters bring forth abundantly the moving creature that hath life, and fowl that may fly above the Earth in the open Firmament of Heaven*: and again, *Let the Earth bring forth the Living Creature after his kind, Cattle, and creeping things, and the Beasts of the Earth after their kind.*

Howbeit the manner of the Propagation of living things is various. In Plants indeed if a branch of Willow be pluckt from the Tree, the Soul is divided by division of the matter, and abides in the branch; and therefore from the said branch stuck into the Earth, a Tree of the same sort will grow up. The same is done in other Plants by their Roots, in others by their seeds, and in others after other manners propagation is caused; as may be seen in the Writers of Husbandry. In all which nevertheless it is necessary, that the matter taken away may afford a fitting Mansion for the soul; which every part in all Plants cannot afford. For examples sake, A Willow is propagated by a bough stuck in the Earth; but a Pear-tree cannot be propagated after the same manner.

But in Animals or living creatures, although the manner of Propagation may also seem to be various, whiles some produce Egs, others living creatures: yet herein they seem al to agree, in that Animals do not generate by any part of their body pluckt off as Plants, but by seed, or somwhat which answers to seed.

For the seed which *Epicurus* (as *Plutarch* relates, *de placit. Philos. Lib.* 5. *cap.* 3.) called *an Abstract of the Soul and Body*, being cut off from the rest of the body, according to the division of the subject, the Soul is also divided, and some portion thereof is with the seed separated from the Animal; which being of the same species with the Soul from whence it is taken, is now become numerically different, in regard of the subject. Out of the seed, by reason of this soul, a new Animal arises, while the soul lying hid in the seed, rouses it self, and displaies its Faculties, and by operating manifests it self; and making use of the innate heat and spirits, it begins to shape al things necessary to the constitution of an Animal or livnig creature, and distinguishes, disposes, orders forms, and fashions the subject matter; that so it may have a perfect and fitting house, like to that from whence it came, and that it may have Instruments in a readiness, whereby it may put forth al its Faculties, and exercise al its natural Actions; which house it afterward possesses, after the same manner as it insinuates it self into the new matter of Aliment, when the Creature grows.

Howbeit, there is betwixt Plants and Animals, especially the more perfect sort, this difference; That Plants which breed seed, breed it so qualified, that it alone suffices to the production of a like Plant: but in the more perfect Animals which have Sex, the seed of neither Parent is sufficient to beget their like; but as *Plato* hath it, Each Sex contributes its shot to the matter of Generations; and the seed of neither Sex taken alone, but of both joyned together, and united in the Womb of the Female, is prolifick and fruitful seed.

Chap. 3. *Of the Parts of Plants.*

SInce therefore there are three manners of Life, and Plants live, are nourished, grow, and generate; Bruits have besides, the use of sense and local motion; and a Man besides all these, hath the use of Reason: having spoke of the Vegetative Soul, before we shall speak of the Sensitive and Rational Soul, we must first treat of Plants. *Now a Plant* (which the Greeks call *Phuton*) *is a Body animated and vegetative, or endowed with a nutritive and generative faculty.* Where I must in the first place acquaint you with this, of which mention was made before, viz. How that many are of opinion, that all sorts of Plants have no other Faculty but the Vegetative, which is common to the whol kind, but that only the same kind is restrained by certain bounds to the proper faculty of its own sort. But this is a false Opinion: For if the case were so, there should be indeed no specifical difference

The definition of a plant.

ference in Plants and Animals; nor should a Rose differ from an Oak, nor a Mouse from a Lyon, except in some Accidents. But thus we are to hold; That the Vegetative Soul alone does not constitute any sort of Plants; nor does the sensitive Soul constitute any sort of bruits, but only an Animal or Living creature, which is the kind comprehending Man and Beast: but the sorts of Plants and Animals do differ by their specifick forms; as namely a Rose from an Oak, a Fir-tree from a Violet, a Dog from a Wolf, and a Wolf from a Lion and a Man. And from the difference of forms proceeds this diversity of Actions, so that among Living Creatures some are more ingenious than others. And in vain it is that some anxiously dispute, Whether some Animals besides Man, are not Rational? For those actions we see in some Animals which are more ingenious than others, do not proceed from a Rational Soul, which is proper only to Man; but from the Soul that is proper to that sort of Animal. For as a Rose hath one soul, a Poplar another, and therefore the Rose and the Poplar have different operations: even so, as there is one soul of a Sheep, another of a Sow, another of a Dog, another of a Fox, another of a Lyon, another of an Elephant; so also all these sorts of Living Creatures do differ both in the structures of their bodies, and in their specifical actions. And although in some sorts of Animals actions appear sufficiently wonderful; yet the soul of Man hath only gained a proper name, and is termed Rational: the rest are for the most part destitute of proper appellations. But that we may speak now of Plants; every Plant consists of a proper soul, and of a body convenient to its sort.

whether som bruits are rational?

We have already spoken of the Soul, it remains that we should speak of the Body. But first there is a Question that presents it self: Whether the two Sexes are in Plants? To it *Scaliger* answers, in 1. *de Plantis*: There are in Plants (quoth he) the principles of Male and Female confounded, and that by an excellent design of Nature. For since Generation is made by an agent in a Patient; Nature hath put into her work, to which she had denied Motion and granted Generation, proportionable generative faculties joyned together, which may be also hence collected: Because in some Plants it is seen, that of one seed the male, of another the Female does spring up. Which is apparent in Hemp; Out of the same trunk proceeds seed, which partly grows to be Male, and partly Female.

whether there are two Sexes in Plants?

Now some parts of Plants are necessary to the constitution of the whol Body; others are superfluous. There are some hard Excrements, as Mushroms, and Puck-fists; some soft, as tears; and of these, some remain liquid; others grow hard, as Gums.

The Excrements of Plants.

Among the parts necessary to the constitution of the body, besides that same juyce diffused through the substance of the whol body, wherewith Plants are nourished, and which answers to the blood in Animals, the most simple are, Fibres, Nerves, and Flesh. Fibres, which the Greeks call *Ines* (which *Scaliger*, *de Plantis*, would rather call threds or hairs; because the lobes and little roots of the Liver are called *Fibræ*) are those long, continued, stretched out parts, running through the whol Plant, answering to Veins, Arteries, Nerves, and Fibres in Animals; the greater and more succulent whereof are called Veins and Ribs, but the thinner and drier are called Nerves: And they are made both for the nourishments distribution into all parts of the Plant, and also for their firmness and consistency. The flesh is the remaining substance of the Plant, answering to musculous flesh in Animals. Now the flesh is of three kinds; some is moist, such as is in Cherries, Prunes, and such like fruit; some is a little more solid, such as is the pulp of a Pear and an Apple; some is of a more compact and woody substance as it were.

Their simple parts.

Fibres and Nerves.

Flesh.

Of these are made others, which themselves also are numbred amongst the simple and similar parts; viz. The Wood, the Marrow, and the Bark. The Wood in Plants called *Lignum*, is a body hard, that wil cleave, and consists of thin fibres: the middle part in the Wood is called the Marrow, Pith, or Heart: The Coat wove together of Fibres, going about the wood is termed *Cortex*, the bark; which when 'tis very thin, 'tis by a special name called *Cutis*, the Skin or Rind, especially in Fruits, whose flesh is alwaies covered with skin: that which is thicker is called by the general term *Bark*. Howbeit the Bark it self is not simple; but in most Plants there is an outer, and an inner: The inner is called *Liber*.

Wood.

Marrow.

Bark.

As to the compound parts of Plants, some are constant, others mutable. The constant are, the Root, the Stock, the Bough, the Branch: The mutable are, the Leaves in most, the Flowers, the Fruits. The Root is the lowest part of a Plant, whose Office is, not only to fasten the Plant and support it in the Earth, but also to draw its nourishment; and therefore it's compared to the Mouth in living creatures; yea, and by some the concoction of the Aliment drawn out of the Earth is ascribed to the Roots.

the Compound parts. 1 Root.

the stock, stalk, trunk Branches, Boughs, twigs. Suckers.

The Stock, Stalk, or Trunk of a Plant, is that part which riſes immediately from the Root. Which is indeed ſoft in Herbs, and is termed the ſtalk; but in Trees and woody ſhrubs 'tis hard, and termed *Caudex* the ſtock. The ſtalk and ſtock parts into branches, and the part where the branch iſſues is properly called a knot; the branches are divided into boughs and twigs; beſides theſe there are ſuckers, or ſmal twigs that grow up out of the Root.

Leaves, Flowers, Fruit.

Out of the boughs and twigs ſpring the Leaves, Flowers, and Fruits; and in ſome Plants tendrels, fingers, or claſpers, by help whereof they rear and ſuſtain themſelves againſt ſome wall, pale, tree, &c. Parts of the Leaves are the little ſtalks they grow by, yet ſome Plants have them not, as the Indian Fig-tree.

Flowers.

The Flowers to Plants are as the child in the womb, which come to perfection in the ſeed and fruit, or they are rather the firſt covering of the fruit. Now the Flowers conſiſt of a moſt thin exhalation and a ſubtil ſpirit, which breaks forth when any Plant does grow wanton and big with deſire of generation. For there is no emiſſion of ſeed without ſuch a ſpirit, nor any propagation of the ſoul, in Plants nor in Animals. Now the Flower includes within it ſelf, and defends the fruit when it firſt breaks forth, till it becomes more firm and able to bear the injuries of the Air. For then the ſpirit ceaſing and failing, which breaks out with the fruit, and in the act of Generation, the flower falls off. Howbeit all Plants do not bloſſom, nor do all that bloſſom bear fruit. Now the flowers are compounded of divers parts: For they conſiſt of very thin Leaves, ſeverally colored, ſhaped, and ranked in ſeveral Plants. Then is the Cup wherein the little Leaves are planted as in their baſis, and wherein they are ſhut as in a caſe. There are alſo threds or hairs, ſuch as the yellow in Lillies and Roſes; finally, there are the ſmal ſtalks by which the flowers hang.

the Cup.

Fruit.

Finally, there is the Fruit, by which word we ſometimes underſtand the ſeed; ſometimes beſide the ſeed, the fleſh with the ſeed is after a ſpecial manner termed Fruit. For the ſeed is either contained in Cods, as that of beans and peaſe; or in Caſes; or in the pulp of the fruit, as in prunes, pears, cherries. Now the Greeks term that ſame fleſh or ſubſtance which compaſſes the ſeed, *Pericarpium*. And of theſe parts do Plants conſiſt, and ſome have all theſe parts, others not. And ſome have only one of them, others more. The whol ſubſtance of a Puckfiſt is well near all Root. Contrarywiſe ſome have no Root, as Miſſelco which is ſuſtained and nouriſhed by the Root of another Plant. Alſo Toad-ſtools have commonly no Root. A Ruſh hath no branches; Dodder no Leaves; the Fig-tree no flower; the Orice flower no fruit; Maiden-hair neither flower nor fruit.

Beſides theſe parts, ſome Plants alſo have others, which grow out of an excrementious humor. Such is the moſs of old Trees, the little ſpunges on Dogs-bryar, and other excreſcences on other Trees.

Chap. 4. *Of the Differences of Plants.*

the diviſion of Plants.

NOW Plants are divided into four kinds: *Dendron*, a Tree; *Thamnos* a Shrub; *Phruganon* a Buſh, (which *Gaza* calls *Suffrutex*, though *Scaliger* like not that word, *Exercit.* 139.) and *Botane* an Herb. Now how theſe kinds differ, is not ſo manifeſt. They are commonly diſtinguiſhed by their Trunk, and their continuance: but *Scaliger* likes not this kind of Diviſion, *Exercit.* 389. For alſo Harts-tongue laſts all the year without any Trunk. And Lettice and Coleworts have a kind of trunk, which are Herbs. He therfore both *in the place alleadged, and in his* 1. *de Plantis*, thus diſtinguiſhes them: An Herb ſends from the Root Leaves, beſides thoſe two common to all, which preſently iſſue out of the pulp of the ſeed changed; and in proceſs of time a ſtalk, though ſome never have any. But in a Tree and buſhy ſhrub theſe Leaves do not firſt come forth, but in the firſt place a ſtalk, and that one, or many; if one, either it is a great one, and that is a Tree; or a little one, and that is a ſhrub; or if many, then it is a buſh: and it is the property of a Tree not to die and come up again; but ſhrubs and buſhes do ſome continue as trees, and others die and come up again, as Herbs. Thus then a tree and a ſhrub agree, That each hath a ſingle trunk. But they differ in greatneſs, and ſometimes in yearly dying. A buſh differs from a tree in ſmalneſs, and therein it agrees with a ſhrub; but it differs from both in the multiplicity of its ſtems or trunks. There is no need it ſhould laſt all the yeer, no more than that a ſhrub ſhould. An Herb agrees with a ſhrub in the ſingle-

neſs

nefs of its ſtem, as the Colewort; ſomtimes with a buſh, in the multitude of its ſtems, as Fennel; ſomtimes with neither, by having no ſtalk.

But *Scaliger* ſeems not to have perfectly explained the whol Buſineſs; and eſpecially there is a doubt concerning the Shrub, which he will have to be ſingle ſtemmed, becauſe he held that the ſhrub had but a ſingle ſtem: whereas others attribute a manifold ſtem to the ſhrub, and they ſay that is a ſhrub which amongſt wooden Plants is of ſmalleſt height and thickneſs, ſuch as Rue, Sage, Hyſop, Marſh-mallows.

In ſearching out the Univerſal Nature of Plants, we muſt diligently enquire into their differences: which are indeed very many, ſo that it is hard to omit nothing, and in the mean while, not to produce things unprofitable and ſuperfluous. Now theſe differences are taken from their Original, Native place, internal form, external figure and matter. Now ſince the internal forms lie hid, nor are known to the ſenſe, they muſt be known from the vertues and qualities which proceed from them.

And firſt from the manner of propagation, which is manifold. For, firſt of all, ſome Plants ſpring of their own accord, in ſuch places as are far from the reſort of men, and are not capable of tillage. For the Earth hath in it the hidden ſeeds of Plants, from the beginning of the world, inſerted thereinto by the Divine Benediction, and ſhe ſends them forth out of her boſom; or ſhe receives ſeeds brought from elſewhere by Winds and Rains, and other means, and cheriſhes them in her lap; which manner notwithſtanding does appertain to that which follows. For in the ſecond place, ſome Plants ſpring from others. For firſt ſome Plants are propagated by ſeed; ſome by roots, bulbs, boughs and branches, and ſome are propagated by one of theſe, others by more: ſome ſpring from ſeed alone, as Smallage, Marjoram, Henbane; others hardly or never of ſeed, as the Fig-tree; others late, as the Peony; others of a Root alone, as the Hop, and Acorus; others of ſeed and branches, as the Roſemary. And the way of propagation by branches is again threefold; For either the branch or bough plucked off, is ſimply ſtuck in the Earth; and ſo the Willow and Roſemary are propagated; or the branch is inſerted into another trunk, which is called Grafting; or when the Suckers which ariſe from the Root are pulled away. Or when a branch neer the Root hath its lower half covered with Earth, the upper part remaining free. For then that branch ſends out Roots into the Earth: which being done, a yeer or two after that branch is cut off from the Tree, and becomes a peculiar Plant: or of one Plant many are made. So the Dreſſers of Vineyards are wont to wean their Vines.

Moreover, Some Plants grow in moiſt places, others in dry. Thoſe which grow in moiſt places, grow either in the water it ſelf, or near the water, as on the banks, or upon Walls and Rocks, and other places, which are moiſtened by the appulſe, or ſprinkling, or vapor of the waters, as Liver-wort and Maiden-hair. Thoſe which grow in the waters, grow either on the top, as Duck-weed, or from Roots. Alſo ſome never mount above the water, as the kinds of *Alga*, Sea-weed, or Ore-wood; others ſpring above the water, as *Aquapium*. Again, ſome grow in Brooks, others in Fountains, others in Ponds, Pools, and Lakes; ſome grow in the Sea, others in other places where water hath been, but now is not, as *Xanthium*, or Ditch-bur. Again, Land Plants do grow ſome on Mountains, Hills, Rocks, Walls, Houſe-ſides, upon hedges, in fields, meadows, Vineyards, Woods: others in plain places, earthy, gravelly, ſandy, or clayiſh.

To the Native place alſo belongs this conſideration, that ſome Plants are inſtead of ground to others which grow upon them, as to Moſs and Miſſelto which grows upon the Oak, the Holm, the Pear-tree, the Hazel, the Linden, the Birch, the Apple-tree, the Plum-tree, the Fir, the Pine, the Elder, and Cheſtnut-tree.

Moſt indeed of the Ancients were of Opinion, That the Thruſh having eaten Miſſelto-berries, the pulp being digeſted, the ſeed was caſt out with the dung, and falling upon ſuch Trees as the Thruſh uſed to ſit upon, from that a new Plant of Miſſelto ſprung upon the ſaid trees. But this conceit is not agreeable to Reaſon: For it is not probable, that the ſeed can ſo cleave the barks and pierce into the hard wood of a tree. And why ſhould it not grow upon many more trees on which thoſe birds neſtle, as wel as on the foreſaid? Nor hath there ever any ſeed been found in the maws of Thruſhes that have fed upon Miſſelto-berries. Moſt likely therefore it is, That Miſſelto is like the horns which ſpring out of the bones of Animals, and that the principles of Miſſelto, in a juyce Natural thereunto, being cheriſhed by the internal heat, and aſſiſted by the heat external, do grow together into this Plant.

Moreover, ſome Plants grow moſt ſpeedily and attain their perfection, others very

ſlowly; ſo that this difference is manifeſt in the Alder, Willow, Peach, Pitch-tree, and Oak.

Again, ſome laſt all the yeer, as Trees and Capillary Herbs; ſome continue not. And of theſe ſome die and grow no more, as Wheat, Barley; others grow again, as Gentian. And of theſe ſome laſt all the yeer, as Agrimony; and ſome periſh within the compaſs of a yeer in ſeveral manners. For ſome laſt one month, others three months; ſome two years, others three, and others four. Again, ſome are perpetually green, as the Fir, the Box; in others their Leaves fall off, and grow again.

Moreover, ſome are fruitful, others barren; ſome bear flowers only, others both flowers and fruit; and ſome only once in their life, others often; and that either yearly, or every other year: and ſome flower in their firſt year; others in the ſecond, third, and ſome not till their fourth yeer.

Alſo in their figure and other qualities partly ariſing from their forms, there is a great diverſity. For ſome are ſtraight, others crooked, round, cornered, Turbant-faſhioned, hollow, ſolid, prickly, without any knot. They differ in ſubſtance, which is ſpungy, compact, ſoft, hard, thick, thin, fat, clammy. Some are temperate, others hot, cold, moiſt, dry; ſome are ſmooth, others rough, thorny, hairy, downy. The taſt of ſome is ſweet, of others bitter, biting, ſalt, harſh, ſowr; others are void of taſt. Alſo ſome Plants have taſt in al their parts, others in ſome only. Some have no ſmel, others have a ſtrong ſmel, others a ſweet; ſome a vehement ſmel, others a weak; ſome ſmel totally, others only in ſome part.

There is no leſs variety in their colors. For though al Plants are green; yet ſome are more, others leſs green; ſome are of a light, others of a deep green; in ſome there is a whitiſh greenneſs, in others a yellowiſh, in ſome a reddiſh; ſome are ſpotted, and others have no ſpots.

Moreover, there is a great difference of Plants in reſpect of the parts whereof they conſiſt. For the juyce wherewith they are nouriſhed, and which anſwers to the blood in Living creatures, repreſents water in ſome, milk in others, as in Spurge; in ſome it hath a Saffron dye, as in great Celandine; in others it repreſents Oyl: and therefore it differs much in color and taſt. Alſo ſome juyce is wholſom, another purging, another venemous.

Again, The Fibres in ſome Plants are ſtreight, in others oblique, ſmal, thick, ſoft, hard. The fleſh is in ſome thick, compact; in others ſpungy, taſtful, taſtleſs; alſo it is of different ſmel and color in different Plants. The Bark is fleſhy, nervous, clammy, in color, taſt, ſmel, much different: And the ſame differences we find in the Wood. The Matrix or Marrow, is in ſome ſolid, in others ſpungy.

Alſo there is a great difference of the Roots of Plants. You have a Root great, ſmal, long, ſhort, continued, cut off; round like a Globe; ſingle and manifold; fibrous; collected, ſpreading; deep, ſhallow; thick, thin; ſoft, hard; ſtiff, limber; criſped, even; ſtreight, bending; compact, ſpungy; fleſhy, barkiſh, woody; round, turbant faſhioned; ſingle, double; hairy, ſmooth; rough, glib; moſſie, juycie, dry; conſiſting of ſcales, uniform; crumbly, ſoluble, boylable, eſculent; heavy, light; white, yellowiſh, red, black; ſweet ſmelling, ſtinking; bitter, ſweet. A great Root bears a great Plant; a little Root, a little Plant; a great Root bears a ſmal Plant, as in a Turnep; a little Root a great Plant, as in a Pine-tree: as *Jul. Cæſar Scaliger* hath collected, and digeſted theſe differences, in 1. *de Plantis.*

The ſtems do ariſe ſome before the Leaves, others with the Leaves, in ſome they are perpetual, in others annual; in ſome ſtreight, crooked, trailing on the ground, growing upright, thick, thin, ſolid, hollow, knotty, without knots, woody, herby, round, four ſquare, three cornered, nervous, ſtreaked, ſmooth, rough.

The variety of Leaves is thus digeſted by *Jul. Cæſ. Scaliger*, in 1. *de Plantis.* In reſpect of ſhape: there are round Leaves, as in Penny-wort, or Two-penny graſs; almoſt round, as in Bindweed, ſmal Celandine, Aſarabacca; oblong in Hyſop; plain in the greateſt part of Plants; round and long in Stone-crop; with a continued edg in the Birthworts; with a creſted edg in the Lawrel; a Saw-faſhioned edg in the Elm; blunt teeth in Scordium; large toothed in the two Cichories; ful of bendings in the third kind of Cichory, which they call Monks-head; forked in the *Caucalis* or baſtard Parſley; fingered in Ellebore and Woolfs-bane, lobed in Fern, hair-like in Fennel. In reſpect of their Surface, they are rough, biting, ſharp-pointed, in Borrage, Nettles, Artichoaks; they are prickly either by reaſon of their kind, and that continually, as the Bur-Thiſtle; or by age in a kind, as the

Sow-

Sow-Thiſtle. Some have for Leaves real Thorns, as the *Corruda* or wild Aſparagus; ſome as it were Thorns or Prickles, as the Juniper. Many have thin leave, Purſlane have thick. The Leaves of moſt Plants hang on by a ſmal ſtalk, which is ſtreight or crooked, long or ſhort. Some have no ſtalks, as the Lilly. Alſo from the places of the Plant; from the root, from the ſtem, from the branches; on the top; on the bottom. The Flower-de-luce hath ſharp-pointed Leavs, moſt Plants have them blunt. In reſpect of Quantity: they are great, little, broad, narrow; ſingle, manifold, In point of relation and ſcituation, ſome grow thick and cloſe together, ſome grow thin and far aſunder. In reſpect of colour; they are al in a manner green, but with a various greenneſs; ſome few are pale-green, as a ſort of Orach; ſome red as another ſort of Orach and Beets. Alſo ſome naturally die by ſickneſs in the Autumn, as the Bramble, the Vine, the Apple-tree. In point of ſcituation; ſome ſtand bolt upright, others hang down, ſome are ſaddle-ſhap'd, crooked, criſped, rouled together, hollowed as the Lettuce; ſtreaked, nerved, veined, with bending Gutters. And what hath been omitted in the former differences; as the ſoft, hard, leatheriſh, limber, brittle, ſhining, dul, woolly, hairy, ſmelling ſweet, acid, bitter, ſalt, ſweet, harſh, taſtleſs, continued, with holes bored through, or holes as it were, as in St. Johns-wort. Alſo the diſpoſitions of trembling, of falling, of abiding, and turning according to the Sun. Alſo of order; ſome are ſet in a confuſed manner, others are orderly placed; ſome alternatively do cloath the branch at equal diſtances, ſome are ſet juſt one againſt another, whether they be two, three, or four, compaſſing the branch like a Crown. Some breed one Leaf upon another.

Flowers do ſome of them come out before the Leaves, as in the Peach; others after the Leaves; ſome come out the firſt year with the Plants, others the ſecond or third yeer, and ſome later. Alſo in reſpect of the time of the yeer, there is great variety. For ſome flower in the Winter, as black Hellebore; ſome at the beginning, others at the end of the Spring, ſome in the Summer: and ſome flower once a yeer, others twice, others thrice. Alſo the ſcituation and place from whence Flowers grow, is not the ſame: for the moſt part, they grow out of the ſtock, the branch or twigs; yet ſomtimes from the Roots. And ſome flowers ſtick on the ſmal ſtalks, and thoſe either long or ſhort; Some come out of one Cup, others out of divers Cups; ſome come out like cluſters of Grapes, others like ears of Corn, others in a round tuft, on ſome there are more flowers, on others fewer, and ſome of them have many, ſome few leaves. Some Flowers are fertile, others barren, and theſe do ſome of them compaſs the fruit, others are ſeated therein. Alſo there is a great difference in the falling off of the Flowers, ſome fall off more ſlowly, others go away in Down, ſome are contracted, others dried.

The ſame variety is in the colors, odors, taſt, and ſhape, al which can ſcarce be perfectly ſet down.

Finally, The ſame variety is to be ſeen in the Seeds, and Fruits. For ſome Plants bear fruit, others not, as Harts-tongue. Of thoſe which bear fruit, ſome bear much, others little; ſome once every year, ſome twice, others thrice; again ſome bear fruit only once in three yeers. Some bear fruit early, others late; the Mulberry Tree flowers late, its fruit comes ſuddenly to perfection; contrariwiſe the Peach-Tree ſoon flowers, but is long ere it bear fruit. Again ſome flower late, and bring forth late fruit. Some have fruit and no flower, as the Fig-Tree; ſome have flowers without fruit, as the Flower-de-luce; but for the moſt part the fruits come out of the flowers. Some have fruit of only one kind, others of divers kinds, as the Oak. Some produce fruit from their root and ſtem, ſome at their boughs, others on the boughs under the leaves, on the leaves, above the leaves; and the fruit ſticks upright, or dangles, or ſticks faſt, or ſits, or cleaves, with a ſtalk, without a ſtalk, ſingle, double, one, divers, thick together, here and there, far aſunder, rare.

The Seeds grow, ſome of them naked, others are ſhut up in ſome other ſubſtance. And ſome are contained in ſome humor, others in a ſhel or bone, others in an hollow bag, and ſomtimes in one fruit one ſeed, and ſomtimes many, either ranked in order, or without order. There is no leſs diverſity in their figures; ſome are round, others oblong, ſome repreſent one thing, ſome another. In the bags or cods wherein the ſeeds are contained there is the like Variety. For ſome of the Cods may be eaten, but the grain not, as the Ceratia or Careb fruit. Of ſome the pulp only is eſculent, as the Caſſia: ſome cods are not at al eſculent, as of Bean, Lupines, horned Poppy; ſome boyled are all eaten cod and fruit, as french Beans: of ſome only the Surface is eaten, the skin being left, as of Peaſe and the Pigeons-Vetch. Alſo from the figure there is much difference: alſo from the ſubſtance of the Grains, their magnitude, figure, number, marrow, bark, color, ſcituation. *Scaliger* in 1.

de

de Plantis. In fruits also, the Rind wherewith they are covered, is thin or thick, hard, boney, woody, smooth, rough; and al fruits are covered with flesh, skin, or shel. And with it they are either totally covered, or half covered, and that not after one manner. For an Acorn is covered in one manner, an Hazel Nut after another manner. Also there is great diversity of tast in fruits; yea and in one part there is one fruit, in another another. Also some fruits may be eaten, others not; and in some that which is to be eaten is within, as in Almonds; in others both the kernel may be eaten, and the pulp which doth compass the same.

Now to illustrate these differences of Plants with examples would be too tedious. This as it hath been done by others; so *Andreas Matthiolus* a most learned Herbalist, *in his Preface upon* Dioscorides, hath both collected all this variety, and shewed how Plants differ in their native place, their roots, stalks, flowers, seeds, and fruits.

Chap. 5. *Concerning the History of Plants.*

FOrasmuch as that which *Jul. Cæs. Scaliger* writes *in his Exercit. 104. sect. 6. To collect out of Books such things as have been delivered by the ancients is very dangerous: the true knowledg of things is learnt of the things themselves*; is both true in other things and most true in the Doctrine of Plants: they that would gain the knowledg of Plants must of necessity know the Plants themselves. And although in this Age of ours, the Art of Printing hath afforded great helps to this Intent; seeing not only the History of Plants hath been described and published by many, but also the Plants have been delineated, and painted out with elegant pictures, by many learned men, especially *Tragus*, *Matthiolus*, *Fuchsius*, *Dalechampius*, *Pena*, *Lobelius*, *Dodonæus*, *Clusius*, *Taberno-montanus*, *Bauhinus* and others; by which it is much easier to know the Plants than by their descriptions alone: nevertheless Plants are best of all known by view of the Eye-sight.

And seeing in this place it is impossible, by way of compendium to reckon up al plants, much more impossible to describe the same; and that yet it is very profitable to the knowledg of Plants, to have the knowledg of certain general heads, to which al Plants may be reduced; I have thought good in this place to propound certain Tribes, and a method as it were of Herbarisme, with the names of the principal, and the virtues of such as are most in use. For though I know some have been extreamly sollicitous, laboring to reduce all to Dichotomies: yet how unhappily they have acquit themselves therein, the succes doth shew. And therfore I have chose herein rather to imitate *Lobel* and others, who have distributed some Plants at least into certain Tribes. It wil be easie for any man to fetch the petty divisions and enumerations from the foresaid Authors, and there to see their Pictures and Descriptions. Only this I shal hint by the way, that many are indeed superstitious in reckoning up abundance of names and differences of Plants; but very short and bare in seeking out their virtues. It is better in my opinion, to know fewer Plants, and to understand their virtues withal, than to be able to reckon up the names of abundance, which many illiterate Gardeners are able to do; and to be quite ignorant of their faculties and Qualities.

Tribe I. *Mushrumps and Toad-stools.*

Since Nature, yea rather God himself the Author of Nature, contrives and works nothing without order; and that order is also most cleerly to be seen in Plants; therefore I think fit to begin with Mushrumps, and Puck-fists, which are as it were the Rudiments of Plants. Puck-fists grow within the Earth, without any stalk, leaf, fibre or thred. Mushrumps do some grow out of the Earth, others upon the stocks of Trees. Those which grow out of the Earth, are some of them soon ripe, in April: others come late, in Autumn; among which there is great difference, from their shape, color, and other Qualities; and some are fit to be eaten, others are venemous. The several kinds have in sundry nations their peculiar names. There is also a peculiar sort, round like a ball, sticking to the ground without any stalk, whitish in color, which being dry becomes poudery: it dries without any biting, and is therefore used to heal places where the Skin is galled off, and by Surgeons to stop Blood.

Crepitus lupi toe round Puck-fi

Agari

Among Mushrumps that grow on Trees, the most noble is Agarick, which is white, spungy, sweetish in tast, especially that which grows upon the Larch-Tree. It is very wel known

known to Physitians, for purging cold and flegmatick humors. Touch-wood, wel known for its use as tinder in striking fire, doth also grow on Trees. St. *Maries* Bal so called, or *Halcyonium*, is a kind of Toad-stool, also the Seaspunge. *Touch-wood.*

Tribe II. *Mosses and Mossie Plants.*

Moreover amongst the Rudiments of Plants are also the Mosses and certain mossie herbs: amongst the which notwithstanding some perfect Herbs are reckoned. Now Mos is an hairy substance sticking to the stocks of old Trees, upon the ground, and on stones, also swimming upon the water. And there is, I. Earth-mos, which they cal *Lycopodium*, Wolfs-claw, of three sorts, the greatest, middlemost, and smallest. II. Hitherto appertain certain creeping herbs, as hairy Mos, Golden Maiden-hair, and *Ros Solis*. III. The common Mos of Trees, and Broad-leav'd Mos or Lungwort, which heals the Ulcers of the Lungs. IV. *Lichen* Liver-wort, which grows to Stones, in dark and moist places. The Apothecaries cal it *Hepatica*, others cal it *Hepatica Petræa*, Stone Liver-wort, because it is good against inflamations of the Liver and Feavers proceeding from Choler. For it is cold and dry and a little astringent; whence it stops bleeding, and resists inflamations of the mouth. V. Sea-Mos, of which there are many sorts. VI. *Corallina* which is also a Sea-Mos, having a drying and astringent faculty, and kils Worms and drives them out the same day, to admiration. VII. *Fucus Marinus*, Seaweed: of which there are also some kinds; among which is the Sea-Oak so called. VIII. Hither may be referred the common Maiden-hair of the Shops, because of the likness it hath in its stalks to capillary Mosses: appropriated chiefly to the Breast and Lungs, whose gros humors it extenuates: also it breaks the Stone. IX. Wall-Rue, or white Maiden-hair, growing in moist places, and on old Walls; like in faculty to the black and vulgar Maiden-hair aforesaid. X. In this Tribe may be reckoned Duck-weed, which is as it were a Mos, swimming on the top of standing waters: it cools and represses Inflamation. *Corallina.* *Maiden-hair.* *Wall-Rue.* *Duckweed.*

Tribe III. *Grasses.*

In the third Tribe we rank Grasses, among which the first is the vulgar meadow Gras, with long, white, knotted and sweet roots, the decoction whereof is good for the Kidneys and Bladder, and opens their obstructions, and the obstructions of the Liver: it kils Worms also.

There are sundry sorts of Gras; Wood-Gras, Cats-tail-Gras, Cypress-Gras, Knot-Gras, Dog-Gras, Painted-Gras, Sorgh-Gras, Milet-Gras, Canary-Gras, Stanch-blood-Gras, Manna-Gras, Esculent-Gras, shining-Gras, Oat-Gras, Fox-Gras, Wild-Chamomel-Gras, Corn-Grats, Bulbous-Grats, Reed-Gras, Gras of *Parnassus*, Water-Gras, River-Gras, Rush-Gras, Panick-Gras, Sea-Gras, Flowry-Gras, Wooly-Gras, Hares-Gras, Broom-Gras, Gras-nobone, Clove-Gras, or Gilloflower Gras, Mous-tail, Spider-Grats, Sword-Grats or Sedg.

Tribe IV. *Reedy Plants.*

The fourth Tribe contains Reeds and reedy Plants. *Arundo*, a Reed, which the Greeks cal *Calamos*, contains many sorts. For there is in the first place the vulgar smal reed, which is cal'd *Phragmites*, good to tharch Houses and to fence Gardens; after that is the solid or ful Reed, which is not hollow, called *Nastos*, of which Darts are made. There is also the pipe Reed, the *Donax* or *Cyprian* Reed, the broad-leav'd Indian Reed or Cane. Also to the family of Reeds belongs the Water Cats-tail.

Among Reeds the most excellent are the *Calamus aromaticus* or spicy Reed, and the Sugar Cane. For though at this day Apothecaries use the root of the Tree *Acorus* in stead of *Calamus aromaticus*: yet that is not the *Calamus* of the Ancients, which was not a Root, but a reedy hollow Cane in *Syria* neer *Mount Lebanon*, and in *Arabia* and *India*; Which Reed though hitherto it hath been almost out of knowledg; yet it is now come to light again; and is every where to be had at the Apothecaries. It heats and dries, is gently astringent, a little biting, and by tenuity of its parts opens the passages of the Body, moves the Courses, and refreshes the spirits. *Calamus Aromaticus.*

Moreover, The Sugar Reed, or Sugar-Cane, is spungy and ful of pith, and within ful of a most sweet juyce, which either drops out of the Trunk being cut, or it is drawn out of the pith *The Sugar Cane or Reed.*

pith by boyling, which boyling is continued til the liquor congeal into Sugar, resembling Salt.

To this Tribe may be referred the several sorts of Flower de-luce, which differ chiefly in the colour of the flowers, and have their name from the Rain-bow which they represent in their partly-coloured flowers. There are two sorts especially now in use; the one is the vulgar which hath a blew flower, whose Root, especially the juyce pressed thereout, doth powerfully purge the water from such as have the Dropsie. To which belongs the small thin-leav'd Flower-de-luce, also the Chamæiris or ground Flower-deluce. The other hath a white Flower & Root which smels like a Violet, and therfore the Germans cal it *Viol-wortel* or Violet Root: it hath a spicy faculty, heats and extenuates, and is good for the Heart and Brain, but especially for Chest. There are also the *Dalmatian*, *Chalcedonian*, double flowred, and *Portugal* Flowers-de-luces &c. To this family belongs also the *Spatula fœtida*, *Xiris* or stinking Gladon, having a stalk and leaves like the Flower-de luce, but blacker and stinking, its flowers also are alike but lesser and of an obscure purple colour. Also the wild yellow Flower-de-luce. Nor is the Water-gladon with purple flowers to be shut out of this Tribe, though by others referred to the following Tribe. Some cal it *Junscus floridus*, and *Gramen arundinaceum*; *Dodoneus* terms it *Platanaria*, and *Matthiolus Sparganium*.

The Acorus verus. The *Acorus* also or *Acorum* belongs to this Tribe, which the Shops very erroneously do cal *Calamus Aromaticus*. And this is the true *Acorus*, in stead whereof the Apothecaries do somtimes badly make use of the bastard yellow Flower-de-luce, whereas their faculties are far different: for the bastard Orice is void of smel, cools and binds: but the true *Acorus* is of a spicy smel and tast, heats and dries, moves Urine, is good for Gripings in the Guts, and for pains of the Sides, Chest, and Liver. Also the Cyperus, long and round, *Cyperus.* and the bastard Cyperus. Now the roots of Cyperus do heat and dry, and are a little astringent, and therefore good to bring moist Ulcers to a Scar: Also they have a cutting faculty, and therefore are good for such as have the Stone, cannot Piss freely, and want their monthly Courses. Also Galangal the greater and lesser sort, which heats, and helps al cold Diseases caused by flegm, discusses Wind, and helps the Cholick. But the smaller sort is more effectual than the other. Some also refer to this Tribe Costus, Zedoary, and Ginger.

Tribe V. *Rushes.*

To the reedy Plants aforesaid, Rushes are neerest of kin, and therefore they make up the fift Tribe. Now they are all void of Leaves, and instead of Leaves have long round stalks, void of knots, and ending with sharp points. There are sundry even, short knotted Rushes which grow in the waters and watry places. *Schænanthum* is the flower of a certain odoriferous Rush. *Spartum* seems to belong to this Tribe. Also some refer the sorts of *Equisetum* or Horse-tail to this family: which have indeed thin rushy Leaves growing about the Joynts, but knots withal. To the sorts of Horse-tail also pertains the female Knot-*Asparagus* Grass which grows in moist places, and by Brooks and Rivers. Also *Asparagus* is reckoned amongst these; which word in general signifies the tender stalk of any Plant when it first springs up: but it signifies more peculiarly a Plant that sends forth such young stalks fit to be eaten. It is Garden or Wild; and of the Wild there are certain sorts.

Tribe VI. *Bulbous and Taberous Plants.*

Seeing among Bulbous Plants there are many which have affinity with certain reedy and rushy ones of the two former Tribes; therefore we marshal the Bulbous Plants in this sixth Tribe next to them; specially because there are some Bulbous Plants, one sort whereof is only bulbous; the rest agreeing with other Rushes even in the Root. Now a Bulbous (whence this Tribe is termed) is a certain kind of Root short and round, and consisting of many Skins or Scales one within another, as you see in an Onion. The first of these is the *Asphodelus bulbosus* Galeni, *Galen* his Daffodil with a bulbous root. And then there are other Daffodils, whose roots are not really bulbous, but long-round, somwhat like to Acorns, and of those also there are many sorts. I. There is one with a white flower, and that is greater or lesser, which in stead of Roots hath many thick fibres. II. There is also a white-flowred bulbous Plant called *Ornithogalum* Birds-milk, and Yellow Birds-milk, or *Ornithogalum of Narbon*. III. There are three or more sorts of a Bulbous Flower-de-luce. IV. Sin-

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gle Gladen, bearing flowers on both sides. V. *Sisynrichium*, the greater and lesser. VI. Sundry sorts of Hyacinths or Crows-toes, for there is an oriental one greater and lesser; there is the *Botroides* of two kinds; the hairy, the autumnal greater and lesser. VII. *Narcissus*, the Water Daffodil, of which there are many sorts; one purple in the middle; another yellow in the middle; and that is not of one kind, there being one al white and double, another Rush-leav'd, greater and less; a wild yellow one greater and lesser, and the Sea *Narcissus*. VIII. The Bulbous Stock Gilloflower, that with three leaves, and that with four, that with many leaves, and that of Autumn. IX. Sundry sorts of Tulips. X. the Wool-bearing Bulbous, and the *Flos Tigridis*. XI. Sundry sorts of Lillies, the White, the Purple, the Blood-red, of which there are some sorts. The *Hemorocallis* or wild Lilly which lasts but a day; the *Martagum*, the Crown Imperial. Now though there are sundry sorts of Lillies: yet the white Lilly is more used than any of the rest, which hath a rare virtue to soften hard swellings and ripen them, and to take away obstructions; of the flowers of this Lilly a neat Oyl is made, which assuages pain. XII. *Fritillaria*. XIII. *Colchicum*, Medow Saffron, which most cal *Ephemeron*; and which have wrongfully used in stead of *Hermodactilis*. Now there are two sorts of this *Colchicum*, *Ephemeron* or Meadow-Saffron; the first is of a strangling nature, & wil choak a man to death; the other strangles not and is properly called Meadow-Saffron: but the true *Hermodactil* differs from them both. XIV. The Lilly which is not bulbous, cal'd the Lilly convally, or the One-leav'd Lilly. XV. The true Saffron, whose flowers which are in use are hot and dry, doth recreate the Spirits and strengthen the Heart, breed cheerfulness, make al the Senses quick, cure the obstruction of the Liver and the Jaundice, move the Courses, provoke Urine, and incite to Generation; yet too much thereof is hurtful. There is a wild Saffron, a Spring Saffron of several sorts, and an Autumn Saffron. XVI. The Squil or Sea-Onion, which hath a rare cutting faculty, and is therefore commended against cold Diseases of the Brain and Nerves. XVII. *Panoratium*, a Sea-Onion so called, hath affinity with the Squil. XVIII. *Moly*, Ladies-Cushion, or Sea-Grass, the Narrow-leav'd, Broad-leav'd, and the Indian. XIX. The several sorts of Onions and Leeks, to which pertain the Rush-Leek, the Vineyard-Leek; Garden Garlick, and sundry sorts of wild Garlick, as the narrow-leav'd, broadleav'd or Bears-foot-Garlick, and that of the Alpes. XX. Many kinds of the Orchis, Gander-Goose or Dog-stone, which have sundry names from their shapes. XXI. Sundry sorts of *Palma Christi & Satyrium* or Ladies-Traces, Stander-Grass. Of which one kind is now in use, whose Roots are kept in the Shops, preserved in Sugar, and being of a temper hot and moist, are thought to be very good for Persons in a Consumption, and strongly to provoke to Generation. XXII. To this Tribe is referred and reckoned for an *Orchis* the *Bifolium* or Tway-blade, which most do cal *Ophris*; which is also of two kinds.

The white Lilly.

Saffron.

The Squil.

Ladies Traces.

Tway blade.

Tribe VII. *Corns and Pulses.*

To the seventh Tribe we may refer Corns and Pulses: amongst which Wheat is Captain, after which comes *Zea*, *Zeopyron*, *Secale*, or *Rogga* Rye, Barley, Oats, Turkish Wheat, *viz.* al such Grains of which Bread is made. But *Legumina Cerealea*, Pulses, *Galen* tels us are such as of which bread is not made: as Rice, Miler, Panick, Beech-Corn; though some count these Corns and reckon none for Pulses but such as are pulled up by hand. Amongst which nevertheless Authors reckon many things which are food only for Beasts, and not for men, whose seed is in dayly-use; such as are Beans, French Beans, sundry sorts of Pease and Hastifers, Vetches, and Tares; of which many sorts, Wild and Garden; Lentiles, Erets, Lupines, Sesamus.

To which family may be reduced such Plants as have some affinity to these, or which are bastard and corrupted Corns and Pulses, some of which notwithstanding are used for Foods such as are the Fox-tail, Wild and Garden-Flax, Hemp, (which others refer to the Trefoils or three-leav'd Plants) Garden and Wild; Fænugreek Garden and wild; *Hedysarum*, *Securidaca*, and Horse-shoo; *Galega*, Goats-Rue or Cocks-comb, which is of great efficacy against the Plague; *Onobrychis*, Earth-Acorns, *Astragolus*, *Anthyllis leguminosa*, *Stella leguminosa* of *Lobelius*, Birds-foot, *Aphace*, several sorts of Wild Vetches, Sea-Wheat, *Bromos* Wild Oats, Cow Wheat, Smutted Corn, *Orobanche* and *Anblatum* of *Cordus*, *Tribulus terrestris* or Caltrop. Some refer to this place *Cassuta* or Dodder, which removes obstructions of the Liver and Spleen, helps the Jaundice, moves Urine, and is good against Diseases springing from Choler and Melancholy also the Leguminous Capar is referred to this Tribe.

Galega.

Tribe VIII. *Trefoyls, Cinque-foyls, and Herbs of that Family.*

In the first place, there are many kinds of Trefoyls, or three-leav'd Plants: Meadow-Trefoyl or Clover, shrubby Trefoyl, codded Trefoyl, American Trefoyl, Heart-fashioned, spoon-fashioned, horn-fashioned, odoriferous Trefoyl, or Melilot. Also all the sorts of *Lotus* and *Melilotus*, *Cytisus* and bastard *Cytisus*, the *Medica*, the sorts of *Zapogus*, sour Trefoyl or Wood-sorrel, which *Pliny* cals *Oxys*, Golden Trefoyl, or Golden Liver-wort, Marsh Trefoyl.

Also there are sundry sorts of Cinquefoyls or Five-leaved Herbs: The great, the less, the Ash-colored, the creeping, the marrish or berry-bearing Cinquefoyl. Whereunto be-
Tormentil. longs Tormentil, the Root whereof resists putrefaction, is good against the plague, and moves sweat; it stops the bellies loosness, flux of blood, and the Courses. Also 'tis good for such as are fallen from on high, and who are suspected to have received some inward hurt. Moreover, there are other Plants also, which have commonly two Leaves opposite one to another, not unlike the sorts last reckoned, but at the end of the branches they re-
Ononis. semble Trefoyls, and may be reckoned in this Family. Such are *Anonis* or *Ononis*, Rest-harrow, the bark of whose Root moves urine, and breaks the stone: Strawberry Leaves,
Liquoris. wild and Garden Liquoris, whose Root makes the wind-pipe smooth, is good for the Chest and Liver, quenches thirst; cures the scabbiness of the bladder, and pain of the kidneys;
Broom, Broom, petty Broom. Now the seeds of Broom have a faculty to loosen the belly, provoke urine, and break the stone both in the Reins and bladder. Hence a Conserve made of the flowers thereof is very good to remove obstructions of the Liver and Spleen. *Hypericum*,
St. Johns-wort St. Johns-wort: of it an Oyl is made, most effectual to heal wounds. Also this Herb hath the faculty to provoke Urine and the Courses.

Centory. Centory the Lesser, which being beaten green, and laid on, cures wounds, and purges ulcers. It is exceeding bitter, and therefore 'tis called the Gall of the Earth, and cures Feavers, and hath its name thence in the German Tongue; it kils worms. *Flos Solis*, the flower of the Sun, like to *Cistus* and *Ledus*.

Sena. Sena, which is now known sufficiently not only to al Physitians, but even to the common people. For it hath a rare faculty to open, digest, clense, gently purge, and also wonderfully to comfort and strengthen al the members of the whol body; so that it is a purge for al Sexes, and for al long and melancholick Diseases most convenient.

Rue Rue hath no smal affinity with some Herbs of this Tribe already mentioned, both the wild and garden Rue, which is hot and dry, of subtile parts, discusses wind, cuts thick and clammy humors; and consequently cures shortness of breath and a cough proceeding of a cold cause; it moves Urine and Courses, and takes away the Appetite to Generation: among the wild sorts is reckoned also *Hermala*.

Fumitory Nor must we in this place omit Fumitory, which is hot, though accidentally by purging choler it cools, and therefore is by some said to be cooling, though falsely; it opens, and frees the Liver and Spleen from obstructions, purifies the blood, and provokes urine. And therefore it cures Feavers, and all Diseases springing from adust humors; and is most effectual and safe in curing the itch, and other diseases of the skin; since in the mean while it strengthens the Liver, stomach, and other bowels. Hither also must we refer *Thalictrum* or *Thalictrum*, Fluxwort, the greater and lesser. Finally, hitherto belongs Madder, to which Clivers, *Mollugo*, Ladies Bedstraw, sweet Wood-rowel, and other sorts thereof do retain; *Cruciata*, Cross-wary, Gentian.

Tribe IX. *Anemonies, Crowfoots, Cranes-bills.*

Next to the foregoing Tribe, we fitly rank Anemonies, Crowfoots, and Cranes-bils. There are many sorts of Anemonies, differing in Leaves, Roots, and Flowers. There is a tuberous sort; one with many Flowers; one that hath three Leaves. Hither some refer the Flower of Adonis, as also *Dentaria alabastrites*, or *Viola dentaria & pulsatilla*. To these also may be reckoned the greater and lesser hollow Root, which some wrongfully use for Round Birthwort Root.

Moreover, There are also many Crows-foots; some sorts of Garden Crow-foots; and divers wild ones. There is the simple tuberous Crowfoot, and that with the many flowers, the Grassie Crowfoot, the Illyrian, the Alpine, the greater and lesser Spear-crowfoot. In this Family may be reckoned Wolf-bane the greater and lesser yellow; also the little purple and blew one; also the *Napellus* and *Anthora*.

Thirdly,

Thirdly, There are many sorts of Cranes-bils; the tuberous, Herb Robert, the musked or muscovy, the Cretick, Doves-foot, Cranes-bill, *Geranium supinum*, Frog-like, Mountanous, &c.

Tribe X. *Gilloflowers, Rose-Campians, Violets, and the kinds of Loose-strife, and certain allied Plants.*

Gilloflowers, which some cal *Betonica* or *Vetonica*, and *Flores tunicis*, are of sundry sorts, differing both in the color and figure of the Flowers, and other waies. There is the great and the little, the single and double, the white and purple; also the feathered, wild, and proud Gilloflower. Also many sorts of Armenian flowers; among which the most remarkable is the Carthusians Gilloflower, and the *Viscaria* or Catch-fly. But among all the Garden Clove-Gilloflowers are most in use, which with the sweetness of their smel do wonderfully refresh the spirits, and are exceeding friendly to the Brain, Liver, Stomach, and Heart. Hence their Syrup is cordial, good against poysons, and the bitings of venemous Beasts, and is commended by late Writers to encrease blood, and strengthen the Liver. *Gilloflowers* *Clove-gilloflowers.*

Nor is there less variety of *Lychnides* or Rose-Campians; for first there is *Lychnis Coronaria*, to which belongs the Flower of *Constantinople*, and the *Lychnis* of *Chalcedon*. Moreover there is a wild one with a single, and another with a double flower; a sort whereof is *Ocimastrum* or bastard Basil, by some so called. Hither also belongs the Herb commonly called *Papaver spumeum*. Nor is bastard Nigella a stranger to this Tribe, nor Soapwort, Gentian, and *Cruciata*, or Dwarf-Gentian.

Thirdly, In this Tribe may be Ranked the purple Violets, with the sweet flower, both simple and double. These Violets are cold and moist, and the flowers are good for internal Inflamations of the Breast, and smooth the roughness of the Throat and Wind-pipe; allay the heat of the Liver, Reins, and Bladder; mitigate the acrimony of choler, and consequently take away the heat and thirst of Feavers, and strengthen. Also there is a wild Violet without color; also three color'd Violets, or Herb of the Trinity, which we cal Hearts-ease and Pansies. *Violets*

Then there is the *Leucoion*, or white Violet, with a single and a double flower. Also the yellow *Leucoium*, which the Arabians call *Keiri*; whose flowers and also the seed move the courses, bring forth the Secondine and child; the Oyl made of them is good to resolve cold humors, to asswage pains, and to strengthen the Nerves.

Among these are reckoned the *Viola matronalis*, or Matrons Violet, or *Lunaria Græca*; to which the *Viola Mariana* is of kin, or the *Viola Calathiana* or *Pneumonanthe*: as also *Flos ambarvalis*, commonly called *Polyganon*: to which appertain *Cervicaria major, media, minima.*

Next come the sorts of *Digitalis*, especially differing in the color of the flowers. Yea, among these may be numbred *Aquilegia*, chiefly distinguished by the variety of flowers: A dram whereof in pouder is given to such as have the Jaundice, to make them sweat. 'Tis commonly used to drive out the Meazles and smal Pox. *Aquilegia*

To this Tribe may be reduced *Lysimachium* or *Lysimachia*, Loose-strife, whose sorts are, the yellow, the purple; and there are many kinds thereof, some of which have the flowers upon the top of the stalk like a fore-top, or as an ear of Corn; others have them in Cods, which are therefore termed Codded Loose-strifes. There is also a sort which may be called the Shrubby Loose-strife. Among the bastard *Lysimachia's* there is reckoned a blue one. Moreover, because of the affinity of the flowers, we add both some water and marish Herbs: as Water-violets, Frogs-bit, white Water-Lilly, yellow Water-Lilly, Water Crowfoot, Water Archer, the Marish Marigold.

Tribe XI. *Other Plants remarkable for their Flowers.*

To this Tribe many and sundry Plants may be referred, among which in respect of the greatness of the Flower, *Chrysanthemum Peruvianum*, or the Flower of the Sun of *Peru*, may justly be Captain. In the next place Elecampane, whose Root is of great use, being good against poysons and biting of poysonous beasts, is helpful to such as cannot fetch breath without sitting upright, cuts gross humors in the breast, and cures the Cough, moves Urine and Courses, helps the stomach and digestion. *Elecampane*

Next come the other sorts of *Chrysanthemum* or Golden flower, which are commonly

called *Oxen-eyes.* To which the sorts of Chamomel are allied: also *Eranthemum*, or flower of *Adonis*, which some reckon among the Anemonies, as we said before.

Chamomel Chamomel is frequently used in Physick: it heats, is loosning, discussive, mollifies internal and external pains. Of kin to Chamomel, and as it were a wild Chamomel, is *Cotula fœtida.* Also the kinds of Marigolds are to be referred to this Tribe, as also the *African* Flower: also sundry sorts of Blew-bottles: *Tragopogon* Goats-bead, and *Scorzonera.*

Nigella To this Tribe also *Nigella* or Gith is a retainer, whose seed heats, dries, cuts, and extenuates: being smelt to frequently it dries up the distillations of the Head: taken inwardly, it discusseth winds, cuts flegm, moves the Courses, helps shortness of breath. Pellitory also.

Hither also are to be referred the Daisies both Garden and wild: and the *After atticus*, or Star-wort. Nor are the sorts of Tansies unlike in flower, as the common sweet Tansie, the crisped, the Tansie without smel, the little white Tansie. Also *Matricaria* or Feaverfew belongs to this sort, which others reckon among the Corymbiferous Plants, that

Tansie bear clusters of Berries. Now Tansie is an hot and dry Herb, and bitter: it kils worms,

Feaverfew moves Urine. Feaverfew is hot in the third, dry in the second degree: it opens, clenses, is good for the Womb, and brings away the dead child: it cures the Tissick, Melancholy, and the stone. Peony brings up the Rear in this kind, having a goodly Flower. The Root whereof is especially good against the Falling-sickness, and strengthens the Brain and Nerves.

Tribe XII. *Poppy, Henbane, Nightshade, and Herbs of kin to them.*

Poppy First there is Garden Poppy of many sorts, differing chiefly in the flower and seed. All

Opium Poppies have a cooling sleepy faculty; but the black is the strongest. Of Poppy *Opium* is made, which is the juyce which drops out of the Heads of black Poppy in hot Countries, the said heads being cut; and it is afterwards condensed. That of *Thebes* is most commended. Now it is bitter, of a strong smel, causes sleep and stupifies. Touching the Quality thereof Physitians are at variance: while some make it cold in the fourth degree, because of its sleepy stupifying faculty; others say it is hot, in regard of its bitterness and acrimony. But now adaies not only Chymists, but other learned Physitians hold, That sleep and stupefaction is caused, not so much by its coldness, as by a stupefying Sulphure, which is found also in hot things, as in Spirit of Wine: and from such a Narcotick Sulphur *Opium* hath al its force; but its bitterness it hath from a bitter salt. A token whereof is this, That being largely taken it causes a drouzy dulness, with an itching al the Body over: and the Turks use their *Maslach* to make them courageous in Battel, wherewith they become as it were drunk. After this comes Red Poppy, or Corn-Rose; also horned Poppy, of which there are some kinds, and *Hypecoon.*

Also Henbane is manifold, white, black, yellow; Henbane of *Peru*, which they cal Tobacco. It also, though hot and dry in the second Degre, hath nevertheless a Narcotick Faculty; the smoak taken in a pipe draws Rheum out of the Brain; the juyce given to strong persons, purges by stool, the operation being followed by a deep sleep. Some give the water stilled out of the Leaves in Agues before the fit, to drive the same away. An Oynt ment is made thereof good for Wounds.

Winter-Cherries There is Garden Nightshade, and Winter-cherry Nightshade, of which there is an outlandish sort. The Winter Cherries have a notable faculty to provoke Urine, and to bring gravel from the Kidneys and Bladder. There is also a deadly sleeping Nightshade. Hither also belongs the Mandrake. Also of this Family are the Apples of Love, Golden Apples, or mad Apples of *Æthiopia*; also the Thorn-apple; and *Strychnodendrum*, or Woody Nightshade.

Tribe XIII. *Endives, Cichories, Lettices, and Plants of kin to them.*

Endive, Cichory, Dandelion, Gum-Cichory To this Tribe belongs Garden Endive, broad leaved and wild Cichory, Dandelyon, Gum Cichory; al which are cold and dry, bitterish, whence they open and clense, and are a little astrictive; whereby they strengthen the Bowels. Hence they are most profitably and most frequently used in opening the obstructions of the Liver, and other Bowels, and in clensing away cholerick humors. Sundry sorts of Hawkweed are of this Tribe; also Groundsel, Ragwort, Sow-thistle, and sharp thistle; many sorts of Garden and wild Lettice. Al Lettices moist and cool, help a cholerick stomach, and procure sleep.

Tribe XIV.

Tribe XIV. *Orach, Beets, Colewort, Docks, Rocket, Mallows, Cresses, and Herbs of kin to these.*

In the first place there are sundry sorts of Orach; The Garden, the Wild, the Sea Orach; *Bonus Henricus & tota bona*, English Mercury; which some nevertheless refer to the sorts of Docks: *Pes anserinus*, Goos-foot. Then there are Blites, a greater, a lesser, a spotted; to which appertain the sorts of *Amaranthus Purpureus*, or purple Flower-gentle.

Thirdly, there is Spinage and some kind of Beets; and among them the red Beet, whose Root is eaten as a Sallet with Vinegar and Oyl; also some kind of Garden Colewort, also the wild, one sort whereof they cal *Perfoliata*, Thorough-wax.

Fourthly, To this Tribe Borrage and Bugloss may be referred; to which *Anchusa* or Alkanet, and *Echium* Vipers-borrage, are added. Now Borrage and Bugloss (especially their flowers) have a very great faculty to strengthen and cheat the heart, also they refresh and recreate the spirits; and therefore Conserves and Syrups are made of them, which in Melancholick Diseases, and such as proceed from adust humors, are very good. *Bugloss, Borrage,*

Fiftly, Mercury, male and female, *Cynocrambe*, Dogs-Cabbage, and *Herba impatiens* the impatient Herb, or Touch me not; and Pellitory of the wal, which is cold and moist, cleanses, is good for imflammations and burnings. The Leaves applied in manner of a Caplasm to the share, with Oyl of sweet Almonds, are an help to such as have the stone, and provoke the stopped Urine. *Pellitory of the wal.*

Sixtly, The kinds of Docks, as the wild Dock, the Garden Dock, Monks Rhubarb, red Dock, Sorrel, tuberous Sorrel, smalleſt Sorrel. Now Sorrel cools and dries, hinders putrefaction, provokes Appetite, and is therefore good for continual Feavers and Pestilences. *Sorrel*

Seventhly, Garden-Mallows with the double Flower, which is called also the Tree-Mallow, and over-sea Rose; also crisped Mallows, wild Mallows, Marsh Mallows, *Abutilon* yellow Mallows; Vulgar *Alcea*, and *Alcea Vesicaria*; the Cotton-plant.

Eightly, We refer to this Tribe such Herbs as have a biting tast: Amongst which the Captain is Water-Cresses, and a sort thereof called Cuckows Flower; Brooklime; Scurvy-grass; Garden Cresses; Winter Cresses; Indian Water-Cress; Garden Mustard, and wild; al the *Nasturtia* or biting Cresses are hot and dry, provoke Urine, expel the Gravel and stone, and are therefore good for the Kidneys and Bladder. But they are especially excellent against the Scurvy, and principally Scurvy-grass. *water-cresses, scurvy-grass.*

Also Garden Rocket, and wild Rocket: to which may be added smal Celandine; herb Dragon, wild Dragon or Neesewort: several kinds of *Thlaspi* or wild Mustard; among which is that of Candie; *Erysimum*, Bank-cresses; *Lepidium*, Dittander or Pepperwort. The Turnep, the Navew, *Rapistrum* or Charlock; Garden Rhadish, *Lampsana* or Dock-cresses, which others are wont to refer to the Hawk-weeds.

Finally, we add to this Tribe the Nettle, which is burning and stinging, or dead Nettle. The stinging Nettle hath some sorts: they are al hot and dry, being boyled they loosen the belly by abstersion, drive out the Urine and Stone; the seed provokes to Generation; it digests crude humors in the Chest, and is therefore good for them that cannot breath unless they sit or stand upright: it is a present Remedy against the poyson of Hemlock, and the malignity of Henbane and Toadstools. There are also divers sorts of dead Nettle and Arch-Angel. *the Nettle*

Tribe XV. *Mint, Sage, Horehound, Bawm, and Herbs of kin to them.*

In the first place, there are many kinds of Mint: and then there is bastard Mint, *Sisymbrium*, Mountain and field Calamint, Cats-mint, Sarazens Mint. Mint is hot and dry, hath a rare faculty to strengthen the stomach, and help digestion, stops vomiting, dispels wind, ceases gripings, stops flux of the belly, and the whites; it hinders Milk from curdling in the stomach, hinders conception. Calamint is also hot and dry, good for the Tissick, stops gripings, heals the womb, kils worms, brings down the courses, and is especially good for the womb, and furthers conception. *Mint* *Calamint*

In the second place there is Sage the greater and lesser sort, which heats and dries, opens, is especially good for the Head and nerves, and is good for the cough and spitting of blood, and against the bitings of venemous Beasts. Wild Sage; *Sclarea & Horminum*, Clary, of which also there are divers sorts. *Sage*

Thirdly,

Horehound Thirdly there is Horehound white and black: now this is hot and dry, opens obstructions of the Liver and Spleen; purges the Chest, and is therefore good for Persons in Consumptions who have no Feaver, it brings away the Courses and the After-birth: 'tis good against Venoms and bitings of venemous Creatures.

Bawm. Fourthly Bawm, it is hot and dry in the second degree, a great and good friend to the Brain and Heart, recreates the Spirits and comforts the Memory; 'tis good against Poysons and helps the bitings of Dogs, Scorpions and Spiders, being outwardly applied; it moves also the Courses.

Basil. There are also other Herbs, like these in smel, which may be justly reckoned in this Tribe, as Basil, which some think is called *Ocimos* because of its sweet and savory smel. Being smel'd to its good for Head and Heart; the Seed helps the Diseases of the Heart, Discusses sorrow and sadness proceeding from Melancholy, and begets Mirth and Cheerfulness.

Pennyroyal Penny-royal is hot and dry with a certain bitterness and astriction; it hath a rare faculty to open obstructions, and to cut thick humors, to move Urine, and especially the Courses, also cures the Stone, Dropsie, Gout and Palsie.

Origanum. True Wild Origanum or wild Marjoram is hot and dry in the third degree, hath a very great faculty to cut, attenuate and scour, and is good against Poyson. Therefore its decoction is profitably given to such as have the Asthma, Convulsion, Dropsie, and such as are bitten by a Serpent. To Origanum belongs Trag-Origanum, or Goats Origanum.

Wild Time Wild Time *Serpillum*, is an Herb very much of kin to Peny-royal, and sends forth a most sweet and fragrant smel. It provokes the Courses, plentifully brings down the Urine, asswages Headach coming from a cold Cause, allaies the Griping of the Guts, and is good against the Lethargy.

Stæchados Arabian *Stæchados*, most effectual against al Diseases of the Head from a cold Cause.

Hyssop. Also *Polium* and Hyssop, which being hot and dry in the third degree, digests, opens and discusses. Therefore boyled with Honey and drunk, it helps much to digest and bring out flegm in the Chest, and frees the Lungs stuffed with vitious humors; and helps an old Cough.

Mother of Time. Time. Savory. Mother of Time, Time, Savory, are plants of affinity; have in a manner the same faculties, being hot and dry; being mingled with our meats, they help the Concoction of the Stomack, free the Womb distended with Wind; are thought to help the Palsie and al sleepy Diseases.

Lavender and Spike. To these may be added Lavender and Spike, being hot and dry Herbs, spiritful, oyly and odoriferous, most effectual in cold Diseases of the Head. Hence their water applied to the Fore-head and the Temples is good for the Palsie of one side of the Body, and for the Falling-sickness; and a Conserve of the flowers is effectual against the Apoplexy and cold Diseases of the Brain.

Rosemary. Next to these marches Herb Mastich or *Clinopodium* and Rosemary, which is hot and dry, with some astriction, heals al cold Diseases of the Head and Brain, dries the Brain, whets the Senses and Memory, is good for the Poze, strengthens the nervous parts, comforts the Womb, and helps the old fluxes thereof.

Marjoram Marjoram, which also heats and dries in the second degree, also helps the cold Diseases of the Brain; and snuffed up the Nose it causes sneezing and brings away flegm, provokes the Urine and Courses.

Betony. Betony is also hot and dry in the second degree, and cutting; 'tis good for the Falling-sickness, and cold diseases of the Head, purges the Breast and Lungs, opens the obstructions of the Liver and Spleen, cures the Jaundice, strengthens the Stomack, and helps Digestion; moves Urine, breaks the Stone, is good for the pain of the Kidnies and Bladder, moves the Courses, allaies Mother-fits, is good against the bitings of Serpents and Venemous Beasts, is good for Worms and the Sciatica.

Dittamus. *Dictamnum verum* or *Creticum*, Dittamus of *Crete*, being in faculty like Penny-royal, moves the Courses, expels the After-birth and dead Child, facilitates Child-birth, is good against the stingings of venemous Beasts.

Scordium. *Scordium* heats and dries, cleanses and purges the Bowels, moves Urine and the Courses, draws gross and purulent humors out of the Breast, and is therefore good for an old Cough. 'Tis usefull mixed with Antidotes against Poyson.

Tribe XVI. *Scabious and Plants of kin thereto.*

There are many kinds of Scabious, the greater, the lesser, the middlemost, the greatest, the Spanish, and that of the *Alpes*: It is hot and dry in the second degree, attenuates and cuts thick and clammy humors; therefore it cleanses the Lungs, helps the Cough and shortness of Breath, is good for the Scab, effectual against the Plague, pestilent Fevers, and the bitings of venemous Beasts, and is good to move sweat in such Diseases. *Scabious.*

Hereto belongs *Stæbe*, Devils-bit, *Jacca nigra* or black Matfellon. Among these some do reckon the Blew-bottles mentioned before in the eleventh Tribe; also the Royal Comfreys, or Flower Royal, and the *Serratula* or Saw-wort, Centaury the great, Sarasens Confound, *Virga aurea*, or Golden Rod, Plants good to heal Wounds. This Tribe admits also other Herbs, as Agrimony, which hath an attenuating, opening faculty, and is especially good for the Liver; also the Herb of Kunegund or *Avicennas Eupatorium*. *Agrimony.*

Also the kinds of *Veronica* or Fluellen, which is good for obstructions of the Liver and Spleen, brings forth the Urine and Stone, heals the Scab and all Diseases of the Skin, wounds, and especially cancerous Ulcers. Also it helps those that have the Tissick, and who cough up purulent matter. *Veronica*

Vervain, Ground-Oak, and *Teucrium* or Tree-Germander, with Ground-pine or *Chamæpitys* and their sorts. Now *Chamædrys* or Germander, and *Chamæpitys* Ground-pine, have virtues much alike. *Chamædrys* opens obstructions of the Liver and Spleen, helps the Dropsie, moves the Courses, and is good against the biting of Serpents; also *Chamæpitys* opens obstructions, cleanses the Kidnies, moves Urine and the Courses, strengthens the Nerves, helps the Sciatica and other diseases of the Joynts; wherefore 'tis commonly called *Iva Arthretica*, and *Herba Apoplectica*. *Chamædrit* *Chamæpitys.*

Finally Eye-bright, which by a strong faculty comforts the Eyes, and helps dimness of sight. *Eye-bright*

Tribe XVII. *Woolly and Downy Plants.*

Among those Herbs whose Leaves are covered as it were with Down; the first is *Gnaphalium*, Cud-weed or Cotton-weed: And then the sorts of Mous-Ear, *Leontopodium Matthioli*, yellow Stæchados: the third Scorpion-Grass, the sorts of Mullein, and Ethiopian Mullein: To which also other Herbs are referred, though not downy, as *Blattaria*, Moth-mullein, the Primerose, which is good for diseases of the Joynts and Nerves, also for Ruptures and Dislocations of the Joynts, and the Stone in the Kidnies and Bladder; Bears-Ear. Also Hounds-tongue, and *Anchusa* or Alkanet, are by some reckoned in this Tribe. *The Primrose.*

Tribe XVIII. *The House-Leeks.*

To this Tribe belong the kinds of Houseleek, as the great branching Houseleek, the smal Houseleek, that is cal'd *Illecebra*; *Telephium* and *Crassula*.

Aloes, of which is made a thickned Juyce wel known in Physick, it purges yellow choler, helps the Stomack and Brain, resists putrefaction, opens the Hemorrhoids, moves the Courses, cleanses Wounds and brings them to a Scar. *Aloes*

Purslane, which is cold and moist and binding, helps the Teeth when they are on edg, kils the Worms in Children, especially if they have a Feaver withal, is effectual against spitting of Blood, the Bloody Flux, and voiding of Blood. Some also refer to this Tribe the *Radix Rhodia* or Rose-wort, especially good for the pains of the Head. *Purslane* *Radix Rhodia.*

Tribe XIX. *Bindweeds, and of Twining Plants.*

Of this Tribe are Briony, Wild Vine, white Vine, *Dulcamara* or Bitter-sweet, black Bindweed, Indian Bindweed, Blewbel Bindweed.

Scammony, the Juyce whereof, (called by the same name) is famosly known, being an effectual purger of Choler and wheyish Humors; being prepared and boyled in a Quince, 'tis called *Diagridium*.

The *Smilax lævis* greater and lesser, or the greater and lesser Bindweed; the *Smilax aspera*, the Hop, the *Jessemine*, *Periclymenon* or Woodbind, *Hedera clematis* Creeping Ivy, *Daphnoides* or *Vinca Pervinca*; *Flammula* or Spearwort, and creeping Chickweed; Ground-Ivy, Twopenny-wort, wild Tansie or Silver-weed, *Soldanella*; *Mechoacan*, which

was

was unknown to the Ancients, and is now in great use; it purges Flegm and watry Humors, is good for the Falling-sickness, the Gout, the Tissick, Colick, and Mother fits. Hither also may be referred *Epithimum*, *Polygonum mas*, male Knot-Grass, *Anagallis* or Pimpernel; Rupture-wort or *Herniaria*, most excellent for Ruptures, whence it hath its name; which they say doth also move Urine and break the Stone. Some say 'tis especially good to comfort the Sight.

Herniaria, or Rupture wort.

Tribe XX. *The Cowcumber, Gourd, and Plants of kin to them.*

In regard of their long crawling stalks wherewith they creep on the ground, we joyn to the former Tribe Cucumbers, Citruls, Muskmelons, Pompions, Gourds: of All which there are many sorts. Hereto appertains *Coloquintida* or wild Gourd, Balm-Apple, *Balsamina* which is a wound Herb: and the Oyl wherein the fruit hath been steeped after the seed is taken out, is good for Burnings, Burstness, Pains and Ulcers of the Dugs.

Balsamina

Tribe XXI. *Thistles and Thistly Plants.*

Carduus Mariæ.

In this Tribe is Garden Bears-breech, *Carduus Mariæ* or Milky Thistle, which removes obstructions of the Liver and Spleen, and purges the waters of such as have the Dropsie. The seed is said to be good for Convulsion fits of Infants, and to help such as are bitten by a Serpent; and it is now frequently used for the Pleurisie. The Globe-headed Thistle or Roundheaded Thistle, the Downyheaded Thistle, the Goldenflowred Thistle, the Star Thistle, the Artichoak, the Chameleon, *Spina Solstitialis*, Venus basin, Shepherds Rod: *Carduus Benedictus*, the blessed Thistle, commonly cal'd *Carduus*, which is hot and dry, cleanses and opens, resists Poyson, opens obstructions of the Bowels, cures inveterate Feavers, kils Worms, moves Urine, is good against the Stone. Wild or Wood-Thistle; Garden and Wild *Carthamus*: *Eryngus* and *Chrythmus*; *Eryngus* moves Urine, and the Courses, staies Gripings, helps those that are Hepatick and Nephritick, incites to Generation. Also *Cirsium*, or soft Thistle.

Carduus Benedictus

Eryngo Roots.

Tribe XXII. *Tufted Plants, that have Clusters of seeds on the top.*

Fennel In this Tribe Fenel is the Captain, whose Roots open obstructions, provoke the Courses, move Urine. The seed comforts the Stomack, dispels Wind, comforts the Sight, encreases Milk, drives out the Urine and Stones.

Anis. Anise is very much of kin to Fenel, it also expels Wind, provokes to Generation, helps shortness of Breath.

Carway. Caraway, Its seed is hot and dry in the third degree, discusses Wind, helps Digestion, moves Urine.

Dill. Dil, whose seed boyled encreases Milk, allaies Gripings, helps the Hiccup though but smelt unto.

Cumin. Cumin, whose seed is also hot and dry in the third degree, it discusses Tumors and Winds, allaies Gripings, outwardly applied; being drunk it is good for a cold Breast, being beaten and mixt with Vinegar it stops bleeding of the Nose by smelling thereto.

Coriander. Coriander, whose seed prepared, (that is to say, steeped in Vinegar and dried) taken after meat drieth up the moisture of the Stomack, consumes the Spittle, expels Worms, and moves Urine.

Ammi or Bishops-weed, Carrot, *Libanotis* Hogs-Fenel, Bears-breech, Hercules Woundheal, *Asclepium*.

Lovage. Lovage, whose Roots drunk with Wine help the digestion of the Stomack, discuss Wind, move sweat, provoke the Courses and Urine, bring away the After-birth, are good for Mother-fits, heals the biting of Serpents.

Angelica. *Angelica*, which is good against Poysons and the bitings of venemous Beasts, dissolves clotted Blood, purges the Chest.

Pimpernel Mountain Siler, Pimpinel, hot and dry in the third degree, whose Roots move Urine, break the Stone, provoke the Courses, open the Liver, dispel Wind, ease the Colick pains, is good against Poysons.

Master-wort *Imperatoria* or Master-wort, whose Root is hot and dry in the third degree, of thin parts, digests cold Humors, moves Sweat and Urine, dispels Wind, is good for Nephritick and Hydropick Persons.

Herb

Herb Gerard, Fennel-Giant, Hogs-Fennel: Garden and Marsh Smallage, Mountain Smallage, Persley, which moves Urine and the Courses, and drives out the Stone: *Hippoſelinum*, Chervil, *Smyrnium*, *Caucalis*, Sweet Cicely, *Gingidium* or Tooth-pick, Hemlock, *Cicutaria* bastard Hemlock.

Filipendula

Filipendula, which is hot and dry, opens and cleanses with a certain astriction; the Decoction of the Roots drives out the Urine and Stone: some commend the pouder thereof against the Falling-sickness.

Meadow-sweet.

Meadow-sweet, *Thapsia*, or stinking and deadly Carrots, Parsneps, Carrots, Valerian, whose Roots are good against the stingings of venemous Beasts, and the Plague; they take away the Strangury, Cough, Winds; help faults of the Eyes, and comfort the Sight.

Valerian.

Tribe XXIII. *Berry-cluster bearing Plants.*

I think fit to place in this Tribe such Plants as bear Clusters of Berries or seeds and are therfore called *Plantæ corymbiferæ*; for *Corymbus* being a round bunch of Berries such as we see in Ivy, these kinds of Plants have thence their name: such an one is Mugwort which brings away the Courses and After-birth, also the Child, and drives out Urine and Stones.

Mug-wort.

Yarrow, which cleanses with astriction, glews together wounds, stops Blood flowing from any part, staies the Courses, and heals the Bloody Flux.

Yarrow.

The sorts of Tansies, whose flowers in Wine or mul'd Sack kils and drives out Worms, dissolves the Stone, and brings away Gravel.

Tansie.

Matricaria or Feverfew, as the name shews, is good for Women troubled with pains in their Wombs both inwardly and outwardly applied, discusseth Wind and wonderfully strengthens the Womb.

Feverfew.

Ambrosia, *Botrys*, Southern-wood.

Wormwood is a common Plant, but of manifold use, very bitter, very good for a Stomack troubled with Choler; for it scoures it away, by Stool and Urine: It strengthens the Stomack, encreases appetite, comforts the Liver, and opens its obstructions, expels bad humors by Urine; and in this respect it is with great profit used against long Agues, especially Tertian, which at length bring the Patient to a Cachexy.

Wormwood

Chamomel, *Cotula Fætida*, stinking Chamomel, which have been reckoned up in Tribe II.

Tribe XXIV. *Ferns and ferny Plants.*

All Plants whose Leaves are placed along the stalks like wings, may be called Ferns. There is first male and female Fern; to which Polypody is of kin, which cleanses away and digests thick and clammy humors: most say it purges, but experience shews it purges little or not at all; yet it is good to mingle with other Purgers, especially of Melancholy. Oak Fern.

Polypody.

Harts-Tongue, to which though others ascribe other virtues; yet experience tels that it is good for Diseases of the Spleen, whose obstructions it opens, asswages its hardness and swelling, and is good also for the like Diseases of the Liver. *Hemionitis*, or Milkwort.

Harts-Tongue.

Scolopendrium, Ceterach or Finger Fern, is of rare virtue to open and asswage the swelling of the Spleen, cure the Jaundice, break and expel the Stone; *Lonchitis*, great Spleenwort. To these also may be added *Lunaria* or Moon-wort, and *Ophioglossum* or Adders-Tongue.

Ceterach.

Tribe XXV. *Milkie Plants.*

Besides the forementioned there are other Herbs that have a milky juyce in them; as all the kinds of Spurges, *Characias*, with its sorts: *Cyparissias*, *Myrtoidis*, *Paralius*, *Helioscopius*, the broad leav'd, narrow leav'd, Knobby, and the woody, all the sorts of *Esula*, and *Pytiusa*, as *Lathyris*, *Peplis*, *Peplion*, *Chamesyce* or Ground-Fig. The *Esulæ* do purge vehemently Choler and Flegm, move Vomit, burn the Throat, and exulcerate.

Esulæ.

Tribe XXVI. *Nervous Plants.*

In this Tribe we may place all the sorts of Plantane: Now Plantane cools and dries, is astringent and abstersive, and hath mixed faculties: it cures Tetters and Inflammations, is good against all fluctions, yea of Blood; resists Putrefaction and strengthens the parts, and is good against Poysons; Swines-Cresses, All-bone, Fellon-wort.

Plantane.

Psyllium *Psyllium* or Fleawort, whose seed is cold in the second degree, temperate as to moisture and driness, according to *Galen*. Its Mucilage mitigates burnings within and without the Body, is good for exulcerated Guts: yet the frequent use thereof hurts the stomach. Hitherto also some refer Hounds-tongue; Star-wort, or the Harts-horn of *Dodonæus*; Woad, Toadflax, and *Linosyris* or Golden Star-flowered Toadflax, Shepherds pouch, *Vincetoxicum* Knot-grass, *Vincetoxicum* or Indian Swallow-wort, which as the name shews, is good against poyson.

Tribe XXVII.

The remaining Plants which could not conveniently be reckoned in the foregoing Tribes, we put al together into this last Tribe, and leave it to further consideration, how they may *White Hellebore* be better digested and disposed. And in the first place we rank white Hellebore; whose Root purges by Vomit, but very violently, kils the child in the womb, kils Mice mixed with honey and flour; also the pouder drawn up into the Nose causeth sneezing. *Helleborina*, bastard Hellebore, our Ladies slipper.

Black Hellebore After the white comes black Hellebore, which purgeth melancholy, and therefore cures madness, Hypochondriacal melancholy, those troubled with the spleen, Quartan Ague, Falling-sickness, and al Diseases proceeding from Melancholy.

Ricinus *Ricinus*, or *Palma Christi*; it heats and dries, its seeds purge choler and water by stool.

Ladies Mantle Ladies-Mantle and Sanicle, which have the faculty to heal wounds.

Sanicle *Garyophyllata* or Avens, whose Root smels like a Clove, whence it hath its name, it heats and dries, is good for the stomach and Liver, dissolves blood clotted within the body, and helps such as are bit by venemous Beasts.

Avens *Asarum* or Asarabacca, whose Roots cause vomit, and purge out thick and flegmatick humors: they move Urine and the Courses, remove obstructions of the Liver and Spleen, and so are good for the Dropsie and Jaundice.

Asarabacca *Aristolochia* or Birthwort long and round, so called because 'tis good for women in child-bed whose after-births it brings away: also it moves the Courses, and is good for the Tissick and Spleen. *Arum* or Cuckow-pintle, whose Root cuts thick humors in the chest and elsewhere. Dragon, water Dragon.

Birthwort long and round. *Bistorta* *Bistorta* or Snakeweed, whose Root cools and binds, and therefore stops the loosness of belly and flux of blood, is good for exulceration of the Guts, strengthens the inner parts, resists putrefaction and poyson, strengthens and fastens the Gums. Bindweed, Herb Paris, water Pepper, Arse-smart.

Cuckow-pintle *Colts-foot* Colts-foot, whose green Leaves do somwhat cool, and therefore they are good to apply to hot Ulcers. Being dried they are hot and dry, and moderately biting, and their smoak taken in a Tobacco pipe helps shortness of breath; also the Root is used to the same purpose, and against the cough, whence 'tis called *Tussilago*.

Thorow-wax *Perfoliata* or Through-wax, is bitter and astringent. The Decoction or pouder thereof is given to such as are bursten and fal from on high; and represses the starting Navils of children.

Great comfry *Symphytum* or Comfry, of which there are certain sorts: The great, which cools, contracts, and binds, heals Ruptures and broken Bones, stops spitting of blood and other Excretions thereof, and is good for the Bloody flux, and most effectual to sodder wounds.

Lungwort: Hereto belongs spotted Comfrey or Lungwort, good for ulcers, and other diseases of the *Self-heal:* Lungs. Also Bugle and Rock-comfrey; and finally, *Prunella* or Self-heal, which is commended against the blackness of the Tongue in burning Feavers.

Tribe XXVIII. *Of Shrubs and Bushes.*

Shrubs are The Bramble, greater and lesser; the *Cistus* or Holly-Rose, the red Corants, the Barbery Bush, Goats-thorn; *Acacia*, the Slo-bush, the Buck-thorn, white thorn, Holm, Broom, Tamarisk, bastard Dittany, bastard Sena, Rocket, Black-berry-bush, the Myrtle-bush, the Dwarf-Myrtil, *Agnus Castus*, Privet; the Pipe-bush, Curriers Sumach, Box, Hounds-tree, Black Aller or Butchers-prick tree, Spindle-tree.

Tribe

Tribe XXIX. *Trees.*

There are many sorts of Trees, but not so many as of Herbs. There are many kinds of vulgar Apple-trees; also which more belong to this place, there is the Citron tree, the Limon Tree, the Orange Tree, the Pomegranate Tree, the Quince Tree, the Peach Tree, the Apricock Tree, the Almond Tree, the Pear Tree, of which again there are many kinds; the Prune and Plum tree, the Cherry tree, the Mulberry tree, the Fig tree, the Medlar tree, the Cornel tree, the Service tree, the Jujubee tree, the Chestnut tree, the Walnut tree, the Hazel tree, the Pistachio Nut tree, the Bladder Nut tree, the Palm tree, the Olive tree, the Bay tree, the Rose tree, the Juniper tree, the Oak, the Holm, the Cork tree, the Beech tree, the Ash tree, the Alder tree, the Cedar tree, the wild Ash tree, the Poplar, the Elm, the Linden, the Birch, the Willow, the Elder, the Lote, the Savine, the Cypress tree, the Tree of Life, the Eugh tree, the Pine tree, the Pitch tree, the Fir tree, the Larch tree, the Turpentine tree, the Lentisch tree.

And thus you have a Catalogue of the chief Plants, which I have therefore set down, both that al men, but especially our idle Disputers (who alwaies stick in the same general matter, and yet think themselves rare Naturalists) may see by the example of Plants how great the amplitude of Nature is, and how that which we know is the least part of what we are ignorant of: also that such as are studious of the knowledg of Plants might have occasion to consider how there may be a Method in Herbarism, and how al Plants may be reduced to some certain Tribes: Which though I have not here finished and brought to perfection, yet I have laid the Foundation. And not to speak now of others; *Andreas Cæsalpinus* in his Sixteen Books of Plants, undertakes a laborious Method: For after in the first place he hath explained Trees and Shrubs; he propounds the variety of Herbs according to the difference of their Seeds. And in the first place he describes such as bear single seeds under every Flower, or have a single receptacle of seeds: Secondly, such as contain two seeds or receptacles of seeds, under the same flower: Thirdly, such as contain four, or more: And at last such as have no seed.

But though this distinction of Plants seems to be laborious and curious enough, and is therefore commended by some, yet I see not what Foundation it hath; seeing those Plants are joyned in one and the same Tribe, by reason of the agreement of their seeds, which neither agree in any signature, nor any other waies. As for example sake, in the fourth Book, what agreement is there betwixt Valerian and *Spica celtica*, Hemp, Hops, Beets, Wheat and other Corns? In the Fifth Book, how do Cowcumbers and Gourds agree with Dwarf-Elder, Nightshade, Indian Pepper, Lilly Convalley? In the Sixt Book, what agreement is betwixt Rose Campion, wild Turnep, Twopenny grass, and Purslane? And the same may be said of the rest.

But I leave it free for any Body to change and perfect this Method as he pleases. For I am not ignorant that several men have several aims in their Methods of Plants. Physitians rank them according to their faculties and use in Physick. Natural Philosophers have other considerations; some this, and some that.

John written with my hand ay to
be at your command and ay to be
at your command 1705

THE SEVENTH BOOK.

Of Animals, or Living Creatures.

Chap. 1. *Of the Sensitive Soul in General.*

AS the Vegetative Faculty is common to all Living things; so in all Living Creatures there is Sense, which is common both to Man and Beast. *By the faculty of Sense Animals are distinguished from Non-animals*, as *Aristotle* hath it *de Juvent. & senect. cap.* 1. and *de sens. et sensil. cap.* 1. Wherefore having treated of Souls in general, and of the Vegetative or growing Soul, and of Plants; we now come to the Sensitive Soul, and to treat of Living Creatures.

The sensitive soul is not the specifick form of any beast:

And here in the first place, as we did before concerning Plants, so we must signifie, That the Sensitive Soul is not the form of any Animal, though void of reason; nor is a Horse a Horse by vertue of its principle of sense; for so a Pike-fish should be an Horse, nor would a Lyon differ from a Dog. Yet is it most manifest, that these Animals differ in their forms, and in their specifical operations depending thereupon. But what those specifick forms are, is not easie to tel, but they are known by their specifical actions. And though many bruit Beasts perform wonderful actions by their specifick forms; yet are they not such as that we should therefore hold them to be Rational, and to partake of understanding. For as *Scaliger*, *Exercitat.* 317. *s.* 5. rightly proves, No living Creature (except Man) performs actions properly Rational. And the holy Scripture attributes Reason to Man alone, as being created after the Image of God, *Ecclus* 17. ver. 16, 17, 18. *Psalm* 32. ver. 9.

Bruits are not rational:

The faculties of the sensitive soul:

But that we may treat of the Sensitive Soul in general; there are three faculties thereof; *the knowing, desiring, and moving faculty.* The knowing comprehends the external and internal senses so called: Appetite follows knowledg: finally to the thing known the living Creature moves. And seeing the knowing faculty goes before the rest, in the first place we must treat thereof, and for the same cause we must first speak of the external Senses. And here you must observe, that the word Sense is taken two waies; somtimes for the Soul it self, or its Faculty; somtimes for the operation which proceeds from the Sensitive Soul, and is called Sensation.

The word sense taken two waies

Now to the performance of Sense these four things must necessarily concur. *First*, The Sensitive Soul: *Secondly*, the Organ: *Thirdly*, the Object: And *Fourthly*, the Medium, which comes between the Organ and the Object. For in the *first place*, Although Sensation is attributed to the whol Animal, Soul and Body; yet the sensitive Soul is the Primary Efficient thereof, and the body is sensitive by means of the soul, which is the sensator or perceiver of things by the senses. For it is the *Entelecheia* or act by which a sensible Animate Body perceives things without it self. And therefore a dead body void of a sensitive soul hath no longer the use of sense. Now the secondary Efficient is the Instruments of Sense, which are also necessarily required to sensation. For although the soul be essentially present in the whol body; yet is it no where the Author of any sense, where it hath no Organ: and although the same Essence of the Soul which is in the Eye, be also in the Foot; yet because in the Foot there are no Instruments either of seeing or of hearing, in the Foot it neither sees nor hears.

Now

Now the Instruments of Sense (to use the words of *Scaliger*, Exercitat. 297. Sect. 3.) are two: The Spirits which have most affinity to the Faculty; and the Members which have most affinity to the sensible Object. For the Spirits are so subtile, that they may be almost reputed immaterial. They receive the imprinted species or representations of Objects. But the Instruments are the conveighers of the Spirits. And although the Organs of the Senses consist of many parts; yet one above the rest is the chief Instrument of Sensation: which *Aristotle* also tels us in these words, 2 *de part. animal. cap.* 1. *All sense is caused by means of the similar parts, because every sense is of some one certain kind of thing, and each sensitive part is accounted capable of some one sensitive kind of things.* *The Organs of the senses.*

Now the Object is that which is perceived by the Sense, viz. The sensible qualities. For although the Objects of the Senses are said to be singular or several things, and corporeal substances; yet substances are not perceived by the sense, as they are substances, but as they are endued with sensible qualities, and contain in them the formal Nature of a sensible Object. For *Peter* (for examples sake) is seen as he is colored; is felt as he is hot, cold, &c. *the Objects*

Now a sensible Object is twofold; of it self, and by accident. That is sensible of it self, which primarily affects the sense, without the intervention of any other thing, as color is perceived by the sight primarily and of it self. But that is accidentally sensible, which is not perceived of it self, but by help of some other thing wherewith it is joyned and coupled. For example sake, when we say, I see a sweet thing, meaning Milk: the whiteness of the Milk is seen only of it self, which is the proper object of the Eye; but the sweetness because joyned with that whiteness, is said to be seen. *Sensible object twofold.*

A thing sensible of it self, is again twofold; Proper and Common. The Proper is that which can be perceived by one sense, and no other; and concerning which no Error can be committed, as color by the sight, sound by the hearing, &c. But the Common is that which is not proper to one sense, but common to divers. And these are five; Magnitude, Figure, Number, Motion, Rest; as *Aristotle* reckons them 2. *de Animal. cap.* 6. *text.* 64. And to these general Heads may al those be referred, which others reckon up; as neerness and farness, which *Scaliger* in *Exercit.* 66. makes a sixt common sensible thing; Scituation, Continuity, Separation, Roughness, and Smoothness, and others which are wont to be reckoned.

Now which way the common sensibles do affect the senses, is controverted amongst Authors, while some say that peculiar species are by them imprinted upon the Senses, and others deny it. But their Opinion is neerer the truth, who hold, That the common Sensibles do present no peculiar species or representations to the senses; but only determine the species or representations of the proper sensibles, and add to them a peculiar manner. For because the Sensitive Qualities are not perceived separated from their subjects, but together with them, the proper enters the sense with the common by one simple species or representation, yet somwhat qualified: and color appears after one fashion in a square Body, after another fashion in a round. But if the common sensibles should send forth proper species, they should also do it without the proper ones. But that they do not do, which appears in transparent things, as the Air, whose figure we do not perceive by its color which is none at al, but by the containing body, rather by imagination than by sense.

Yet we do not say that the common sensible objects are perceived by accident, but by themselves secondarily. For there are three things which belong to a sensible by accident, which do not belong to a common sensible. First, a sensible by accident acts nothing upon the outward sense, whereby it is said to be accidentally discerned, but is only joyned with that which of it self affects the sense. Again, a sensible thing by accident may be perceived of it self, by some peculiar faculty in the Perceiver, whether it be some external or internal sense, or the understanding. Finally, it may easily be perceived by its proper power.

Now seeing al action is performed by mutual touch, and the sensible object is many times far distant from the Organ of sense; the Question is, how the object affects the sense. Hereinal found Philosophers agree, That some quality is sent out of the object unto the sense. Now qualities are twofold, some real or material, others spiritual or intentional; as was said before in *Book* 2. *chap.* 2. and the spiritual are nothing but Pictures and Images of the sensible objects, flowing from them, pure, thin, and free from the concretion of matter; and that there are such spiritual qualities experience it self doth teach us. For in the Summer time, we see the cloaths of such as lie under a Tree painted green with the color of the Tree; and a cloth held beside a Glass ful of Claret, appears red; and other

examples

examples *Scaliger* brings, *Exercit.* 80. *Sect.* 8. and *Exercit.* 298. *Sect.* 3. And in general the same thing is taught by artificial Glasses, which receive the Images even of things remote. And the same is apparent also as to other senses. And that the Nature of sensible spiritual species or representations is quite different from that of material representations, *Leo Hebræus* shews in his *Dialogue de Amore*, *Lib.* 3. by many reasons. The first is, because al other qualities diffuse themselves successively and by degrees through their subject, but light penetrates suddenly and in a moment through a transparent body. Secondly, a quality when it comes changes the natural disposition of the subject; but Light makes no alteration in the transparent body, save that it enlightens the same. Thirdly, other qualites do not extend themselves through an infinite space, but light does. Fourthly, that though the efficient cause of other qualities be removed, yet there remains some impression upon the subject; but the Illuminator being removed, there is no light remaining. Fiftly, other qualities are moved with their subject; but Light is not moved when the Air or Water is moved. Sixtly, many qualities of the same sort in one subject are joyned and mixed together; but many Lights are not jumbled nor confounded, but two Candles make two shadows, three make three shadows, &c.

Whether al the senses do receive only spiritual representations of things?

The first Question therefore in this place is, *Whether all the Senses receive spiritual representations of things.* Some indeed have been of opinion, that spiritual representations are not necessary in al the Senses, but only in the sight; and that al the other senses are wrought upon by material qualities issuing from their objects. But this opinion is false, and al the senses are wrought upon by their objects with spiritual species or representations. And seeing of al the senses feeling is most terrestrial and most drowned in matter, and its object seems to have most affinity with material qualities, if we shal prove that this sense is not wrought upon by real but spiritual qualities, the same wil be proved of al the rest. But heat according to their opinion, acts upon the touch materially; and therefore produces another heat therein; which nevertheless is false. For al the senses are said to perceive the same numerical object whereby they are affected; which observation is true in spiritual qualities. For although an accident or real object does also differ from a spiritual, numerically, if it be considered in it self and according to its own Nature; yet as being the image thereof it resembles and represents the same, it may be termed the same numerically; and the sense perceiving the spiritual image of a thing, is said to perceive the thing it self; but not so, if it perceive a like real quality produced thereby. So he that hath seen the image of *Æneas*, is said to have seen *Æneas*: but he that hath seen *Ascanius* his Son, is never said to have seen *Æneas*. The same appears from the difference betwixt a material and spiritual quality. For since the action of the first qualities is true motion, and is performed in time, and seldom produces in the Patient a quality answering in degrees to its own vertue, by reason of the resistency of contrary qualities; it would follow that sense should be performed in time and leisurely: also that the sense should seldom perceive the true degree of its object, but commonly a lesser. But seeing it is not thus in sense, we must hold that only spiritual species or representations, which have no contrary, are perceived by sense: which opinion also *Aristotle* professes to hold in 2. *de Anima*, *chap.* 12. *text.* 121. Which also is exceeding manifest in most of the tangible qualities, which if they should act materially upon the touch, they should produce therein a real quality like themselves, and the organ of feeling should become hard by feeling an hard thing, soft by feeling a soft thing: whereas these qualities have no such activity; and no such thing is found, either in the Feeling, or any other sense.

Nevertheless you must here observe, that indeed al sensible species or representations of objects are qualities not material but spiritual, and Images or Pictures of the sensible objects flowing from them, as was said in the *place before alleadged*; and that nevertheless there are some differences of them, and that some are drowned in the matter and cannot get out, others diffuse themselves far from the Body from which they arise, being tied to no matter. The lowest of the Senses is feeling, whose object does no where raise it self out of the matter, but being hid in the matter offers it self to the sense. So that nothing is perceived by the touch, but what immediately touches the sensible body. And just so it is with tasts, which never affect the sense of casting at a distance; but whatever affects the tast must immediately touch and affect the tongue. But the visible species or Images of things, imitating the most noble Nature of Light, are free from matter, and at far distances are carried to the sight and affect the same, no body coming between wherein they adhere. After the same manner *Sound* is diffused to a long distance, and penetrates not only the Air, but also Mettals, especially those that are less solid. Betwixt these species or images, viz. The tangible,

tangible, tasts, and visible representations, smels are as it were of a middle nature. For they for the most part, though they are not brought to the organ of smelling without a subject, as the visible species are brought to their organ; yet is there no necessity that the thing smelt should be wholly applied to the nostrils, but smelling things do send forth certain vapors, which are not themselves odors properly to speak (though some Physicians do so think) but the odours are in them; nor can the species or representations of smels be carried without them, into distant Places.

The original of sensible species.

Now as touching the original of the sensible representations, we need not vex our selves, nor introduce any agent sense, to form sensible species out of the objects. Such is the nature of qualities properly sensible, and this power they have, That they can multiply themselves by sending forth their Images; and al forms can multiply themselves, some both really and spiritually, some spiritually only. And if any shal ask, What way they do it? We can answer him no more than if he should ask us how or why Fire heats.

The Mediums of the senses.

Also a Medium is necessary to Sensation. For seeing the senses are only virtually affected by the object, a Medium must needs come betwixt: which also *Aristotle* affirms, 2 *de Anima, cap.* 11. *text.* 114. *We perceive all sensible objects through some Medium:* And in 2. *de Anim. cap.* 9. *t.* 98. *It is common to all, that a thing laid upon the Organ of Sense cannot be discerned.* And al these things must concur, if Sensation be made, and that rightly disposed to; whereof if one be absent, or be not rightly disposed, the Sensation either ceases or is viciated.

Now wherein the Nature of Sensation consists, Authors vary; nor is the Controversie smal, *Whether Sensation be meerly a Passion*, and nothing but the reception of the representation of sensible things? Or whether besides the reception of the species there is any other action of the Soul concurring thereto? I spare to relate al the Opinions of others, which are at large by Authors related and confuted; only I shal set down that which seems to me most true, and this it is: The sensible species, or the object which sends forth the sensible species, is not the agent or active principle of Sensation: for Sensation is the work of the Soul, and that an immanent work, nor can be attributed to any external thing, especially an accident; but it offers and represents to the sense the thing sensible as the immediate object. Nor is Sensation only Reception; which besides other things, is hereby apparent, in that very often, when the sensible species is received in the organ, there is nevertheless no sensation, because the soul intent upon other things does not discern the sensible appearances: but Sensation is also a kind of Action. For Action which is more noble and worthy than Passion is not to be denied to the sensitive faculty, since it belongs to the vegetative faculty, and to Accidents.

Whether there is an active and a passive sense?

Yet we are not to hold two Senses, one active, another passive, really distinct: but the same Soul is said to act and suffer in a different respect. For the Soul inasmuch as it judges and takes cognizance, is so far said to act; but inasmuch as the species is received in the organ, so far the Soul also it self, which is in the organ and informs the same, is said to suffer. Wherefore to receive the sensible species belongs to the Organ; to judg thereof when received belongs to the Soul: yet because the Soul gives the Organ power to receive the species, and is it self the cause of Reception, Passion is also ascribed thereunto.

the manner of sensation:

Sensation is therefore thus made: Spiritual Representations produced by a material object, are received in an animated Organ: being so received the Soul takes cognizance of them and judges of them, and so is said to be sensible: finally, the Action is received in the Organ, and communicated to the whol.

Whether the sense can err about its proper object?

One thing remains yet to be explained, what credit is to be given to the senses, and whether they may err about their proper objects. The Epicureans did attribute so much to the Senses, that they thought we could never be deceived, and held that al which we learn is to be measured by the Rules of the Senses, as *Austin* saith in his Book *de Civitate Dei*, B. 8. *cap.* 7. Whence *Lucretius* in his Fifth Book, conceives that the Sun and Moon, are no bigger than they appear to us. Contrariwise, the Academicks wil give no credit at al to the Senses. That we may know what to think in this point, we must observe these things following: The sense may err three manner of waies: First about the kind or common nature of its object, as taking color for sound, sound for smel. Secondly, in the sort and particular nature of the object, as to take white for black, bitter for sweet. Thirdly, in its application to the object; when it so apprehends some sensible thing, as if it had in it some quality which it hath not indeed; as when the tast judgeth meat to be bitter, which is not so indeed, but seems so, by reason of the bitterness of choler, wherewith the tongue is infected.

Hence therefore thus we conclude the matter: The Sense cannot err about its object, after the

the first manner: for the sight never mistakes Sound for Colour, nor the Ear Smel for Sound: but concerning the common sensibles it may be thus deceived: for it often takes that which is moved to stand stil; and that which is divided into many parts it often judges to be one continued thing. But in the second manner it is not impossible for the sense to be deceived; and that which is blew seems many times far off to be black. Finally, in the Application both of the common and proper Objects it is deceived: so a white thing sending its appearance through a red Glass, is thought to be red also: for then the sight errs not in the colour, but in the application thereof to a wrong subject; and so it is when the Sun is seen through a red Cloud; for it attributes the redness which is in the Cloud unto the Sun. And therefore concerning its proper object, the sense can be deceived only these two latter waies; about the common object all three waies. Howbeit these errors may be avoided, especially in the proper objects, if these conditions be observed. First, That the Organ be rightly constituted, and there be no fault therein. Secondly, That the medium be fitly disposed, and infected with no strange quality. Finally, That that be a fit distance betwixt the Object and the Organ.

Chap. 2. *Touching the Sight.*

Five external Senses. But that we may now come to the external Senses themselves, which in the outer part of the Body do perceive outward things which are present, we acknowledg them to be five in number. For experience shews, that there are no more Organs of Sense, nor can we find more in Man who is the most perfect of Living Creatures, nor in other Creatures any more: and so many do both suffice the use of Living Creatures, and are able to bring the Understanding to the knowledg of Substances. More may be seen touching the sufficiency of the Senses, proved from their End, Efficient, Subject matter, and Object, in *Scaligers Exercit.* 297. *Sect.* 2. 3. 4. Let us now begin with the Sight: For that is the most excellent and noble of all the Senses; seeing it apprehends more things, more excellent and divers, quicker and at a greater distance than the other Senses; *Scaliger Exercit.* 298. *Sect.* 6.

Sight the most excellent Sense.

Its definition. Now *Sight is an external Sense, perceiving and discerning the representations of things visible.* And Vision or Seeing, is the apprehension of visible things by the Soul exercising its sensitive faculty in the Eye. The Organ of seeing is the *Eye*, receiving the visible species or shews of things like a Looking-Glass: Hence is that common saying that *the Eye is the Looking-Glass of nature*, and that a Looking-Glass is the Eye of Art, as *Cælius Rhodiginus* hath it in *Ant. Lect. Lib.* 3. *Cap.* 28. But the chief part of the Organ is the Chrystalline humor, for the sake whereof the other parts of the Eye were by nature ordained.

The Organ of sight

Its Object. The Object of Sight, is that which is visible. Now what that is, we are to consider. Now although many things are said to be seen; yet as to the proper object of sight, the controversie seems to be chiefly of Light and Color: For the best Philosophers do somtimes say, that Light is the first thing visible and that which is visible of it self: and somtimes again, they say the proper and adequate object of the sight is Color, and that all visible things are coloured. Howbeit these two Opinions are not contrary, but if they be rightly explained they include the true opinion concerning the Object of Sight: For indeed the adequate object of sight is colour, and whatsoever is seen under the notion of colour; and therefore light it self inasmuch as it is said to be seen, is comprehended under colour, and is as it were a whiteness. Howbeit, you must observe, it is one thing to be visible, another to be actually seen. All colour is of its own nature actually visible, nor doth it receive its visibility from any external Cause; and though it should never be seen, yet were it visible of its own nature, saies *Scaliger, Exercit.* 325. *Sect.* 4. and that colour which is in the dark, and deep within a thing, is actually colour, yet light is required that it may be actually seen.

What Colour is. Now *Aristotle* defines colour, in his *B. De sens. & sensibl. cap.* 3. *The extremity of that which is transparent in a terminated body*, or *the Extremity of a transparent thing terminated*: which definition that it may be rightly understood, it is to be observed, that colour belongs to al things by means of perspicuity, and that transparency terminated is the Subject of colours. For transparency being condensed, so that it can be no longer seen thorough, nor transmit the Images of other things, becomes coloured, and is said to be terminated: for it prescribes bounds and limits to the Sight, and is an hinderance that other things cannot be seen which lie betwixt it and the sight; for although that same colour also which is in the middle and depth of a thing, is also colour: yet he seems rather to have defined that which

is

is actually seen, and is in the Surface. For Colour is not the Surface as some ill expound *Aristotle*, but in the Surface: and the extremity of a body as a body is one thing, and the extremity of a diaphanous or transparent body considered as such is another. Now the term or bound of a Diaphanous or transparent body is where it becomes dark.

Colour therfore hath its Original from the termination of that which is transparent: And that is two waies; first only by condensation of the transparent body, without the admixture of another body, after which manner the Stars come to be seen. Again Colour is made by the mixture of a dark body with a transparent. So Fire which is of it self transparent, if it be mixed with exhalations and fumes, appears of a red colour; and the same comes to pass in the Air and Water: for these three Elements are transparent, though in a various degree; for Fire is most of al transparent; after that the Air; Water seems to have some darkness in comparison; but the Earth is absolutely dark. And therefore by the mixture of the earthy parts with the other Elements sundry colours arise. But in the first place, that which is transparent becomes white; and therfore that which is transparent, light, and whiteness, are almost of the same nature: in like manner, Intransparency, Darkness, and Blackness are also of kin. And these are the first, simple and extream colours, which do also proceed from the first simple Bodies, and all other colours consist of a mixture of these; al the sorts whereof to reckon up in this place would be too tedious; touching which *Scaliger* hath many excellent things in his 325. *Exercitation.*

Now apparent colours are made of the Species of real colours mingled with others. And therefore when the Sun's light is mingled with the colour of Clouds, various colors do result therefrom. Therfore we conclude that colour is visible, but that illuminated or shining colour is only actually seen. *Apparent Colours how made*

Whence also a Cause may be rendred why some things are not only seen themselves, but make others to be seen; and some things can be seen themselves, but cannot make other things to be seen: and others again can neither be seen themselves, nor make others to be seen. For some things have an inbred light proper to themselves; some only an adventitious or borrowed light. Such as have an inbred light can be seen without the help of other things. And such as have it plentiful and potent, as the Sun and Fire, do also make other things visible; but such as have little light in them, and so little as can only render them visible, and that but in the Night, do not at al help other things to be seen; such as are some rotten woods, Glow-Worms, and such like: but those things that have no innate light, can neither make other things visible, nor are they visible themselves, unless they be enlightened by some other thing.

Now because Light is necessary to Sight, it is worth our enquiry how it concurs thereto. Some hold, that it is only required to illuminate the object and medium, others that it is necessary also to inlighten the Organ. As to the object, it is altogether necessary that it be illuminated, that it may be actually seen; and that appears by experience. For although the whol Air which is about the Party seeing be illuminated, yet if that which is about the colour be not illuminated, the colour cannot be seen: for the colours of themselves if they be not illustrated by light, do remain sluggish as it were, so that they cannot produce an Image of themselves; and light is the act of colour, not to make it to be, but to make it visible, as *Scaliger* saies, *Exercit.* 75. *S.* 7. Also for the Medium light is requisite: yet is it not necessary that the whol be illuminated, but only that part which is about the thing visible: and so light seems not necessary to the medium as a medium; but only in respect of the visible object therein residing. For even when we are in the dark we see those things that are in an illuminated Medium; and in the deepest wels, where no light reacheth, we see the Stars even in the day time. *How light concurs to sight.*

As to the Organ, we avouch with *Aristotle, de sens. & sensibil. Cap.* 3. *that as without, so within, there is no seeing without light*: howbeit we hold that it is rather an inward and inbred than an external light, which the Eyes of many Creatures that shine in the night, do witness. But that an Eye which is in the thickest darkness can be illuminated and illustrated by a light so weak, as to be able to inlighten things close by it (as for example that which shines from rotten wood) is improbable: As also it seems impossible that a light and colour smal and weak, far distant from the Eye, can any waies inlighten the whole Air as far as to the Eye.

And because that *Light* is altogether necessary to sight, it is enquired, *whether it also be seen.* We answer: That Light while it is in a transparent medium is not seen, as that *which*, but as that *wherewith*; and that it is not seen of it self, but *by accident*; because it makes colours to be actually seen: and when we see colour, we judg that the Air is illuminated. *Whether Light it self be seen*

The Medium of sight.

But the Medium of Sight is that which is *transparent*; and that which is seen is alwaies more darksom than the Medium. Hence we see water in the Air, and the same thing colored is seen in pure cleer water, and hid in that which is troubled. And therefore a thing colored may also be the Medium of Sight, provided it be not quite dark, but more transparent than the visible object. So we see smal creatures incloſed in Amber.

whether sight be caused by receiving in, or sending forth.

The Manner of Sight remains yet to be explained, concerning which there are no smal controversies amongst the Ancients. For though herein al consent, That to cause sight the object must of necessity be joyned to the organ; yet how that is done they are not al agreed. The Platonists (for as for *Plato* himself, some wil have him to be of one Opinion, and some of another; and *Scaliger* in *Exercitat.* 325. *Sect.* 5. cites places out of his *Timæus* and *Meno*, whereby he endeavors to prove, That *Plato* conceived sight to be caused by species flowing from the Object to the Eye) very many skil'd in the Opticks, and al ancient Philosophers in a manner until *Aristotle*, held that the Optick spirits and raies went out of the Eye to the Object, and laid hold of the same.

But this Opinion is false and corrected by *Aristotle*, so that those Ancients are not so much to be blamed, as they are to be chastised who contrary to the judgment of that wise Man, do stil follow those toyes. For Sight as al other Senses, is an immanent action, and therfore it must be performed in the Eyes, and not without. And seeing every agent which acts upon another thing without it self does not receive in it self the end and fruit of its action (as the operation of heating is not received in the agent but the Patient) the fruit also of sight if it were caused by sending forth of raies, would be in the thing seen, and not in the Seer; which is absurd. For the end of sight in a Living Creature is the accommodation of its life: but in Man besides that, also the knowledg of Nature, comprehension of God, and Happiness. Finally, What can that be, which out of so smal an Eye-bal can be sent so suddenly to so many things as we behold, so distant? A corporeal substance, such as are the Optick spirits, cannot be shed forth in so great plenty. For there is nothing that can suffice to repair so many spirits; nor can it be moved in an instant from the Eye so far as to the Heavens: Nor can any quality of it self perform the same; but if it should do this, the soul must needs be in it. But the subject of the soul is a substance, not an accident. Yea, in general, whatever you hold goes forth and causes sight, it must do it by means of the soul. Whence it would follow, that the Air hath in it not only one soul, but the souls of many living Creatures. And those very arguments and many more which are brought by *Zabarella Lib.* 2. *de Visu, cap.* 4. 5. do make against that Opinion of *Galen* and others, who hold, That the sight goes out a certain distance, and is united with the image of the visible object, and that so sight is caused.

the true manner of sight.

Let us therefore hold with *Aristotle*, That sight is caused by the reception of visible images into the Eyes; and that as from every point of a lightsom body into every point of a transparent Medium Light is propagated: so from every part of a colored body, an Image thereof is sent into a transparent Medium, by a right line, and received into the Eye, and discerned by the sight. For even the images received do appear within the apple of the Eye; and an excellent visible object hurts the sight; and the Eye is made of so many parts, for this Receptions sake.

Chap. 3. *Of the Hearing.*

the definition of hearing.

AFter *Sight* we rank *Hearing*; for it (after Sight) is the most excellent Sense, and seems to contend therewith in point of nobility. Now the Hearing is an external sense, which by help of the Ear perceives audible things, viz. Sounds: for the object of Hearing is Sound. Now Sound is a quality arising from the Air or Water being smitten and broken by the vehement and sudden concussion of solid bodies.

What sound is.

How sound is generated.

To the generation of Sound three Bodies are necessary: two of which mutually strike one another, or at least one performing the office of two, in two parts. Now these bodies ought to be solid, that they may gather and condense the Air, and not having many pores. Hence Spunges, and locks or fardles of wool knockt together, do cause no sound; because being ful of many pores, the smitten Air is received by them, and so it is not broken. Besides two solid bodies, a third thing is required, which may be intercepted betwixt those two solid bodies and broken. And this is that which also Fishes hear.

the Medium of hearing.

The Mediums which receive sound are the Air and the Water. They commonly hold, that a certain inbred air of the Ear is the chief organ of Hearing. Contrariwise other later Authors,

Authors, since the Organ of a sense ought to be a similar part animated, do reject this Air: and hold the principal instrument of Hearing to be a certain Nerve spred out in the Ear. And truly the former Opinion is not so allowable as this, unless it be explained as *Capivaccius* explains it; who teaches, that as the innate heat of the Eye is luminous or lightful; so the innate heat of the Ear is Aerial, so that it may be affected by sound, and is commonly called, complanted Air, that is, Air bred in the Ear from the first formation; but that it is not included in any peculiar Cavity, but ingrafted and implanted in the expanded Nerve.

How Eccho is caused.

Here we must not pass over the Eccho, which is a reciprocal and reflected sound from a smooth and hollow place. For as Light and visible Images lighting upon a smooth and polished body are reflected: so sounds, if they light on a smooth, even, and hollow body, whereon they are not broken, they are reflected. And as in general, that sound may be heard, it is not necessary that al the air from the place where the sound is first caused, should be continually broken, as far as to the Ears; but it is enough if the image thereof be propagated so far; even so an Eccho is not bred by a new breaking of the Air, for so this reciprocal sound would not be articulated: but only the image of the former sound rebounding back to us. Nor may a word be only once reflected, but divers times, viz. If the voyce beaten back do light upon other hollow places, one after another. So the seven Cyzician Towers did multiply words received by them with a manifold Eccho. And *Pliny* relates, how in the Porch of *Olympia*, which they therefore termed *Heptaphonon*, the same word was seven times repeated; *Nat. Hist. Lib.* 36. *cap.* 15. And *Lucretius* in his Fourth Book, thus writes:

I've known some Ecchoes, if you spake a word,
Would six or seven times back the same afford.

Chap. 4. *Of the Smelling.*

the Definition of Smelling.

THe *Smelling* follows after the Sight and Hearing in point of Excellency, which is an external sense perceiving smels, by help of the Nose or mamillary processes therein. For

Its object.

the object thereof is a scent or savor.

the Nature of the Smelling.

Now touching the Nature of the Smel, the vulgar Doctrine is, that it is a quality arising in mixt bodies, from a dry savory thing by the Heat mingled with moisture. For they say smel and tast are so of kin, that al things which have tast have also smel, and every thing that hath no tast, hath no smel neither. Hence mixt things only have smels, and not the Elements, which also have no tast: for neither have al mixt things smels, but those only which have tasts. For stones have no smel, which are also void of tast; but woods, and other things which have tasts, have also smels. But herein nevertheless smels and tasts differ, in that drines prevails in smels, moisture in tasts. Hence Nitre hath a stronger smel than Salt, and Salt is moister than Nitre; because in Nitre there is more drines, in Salt more moisture; and things that smel, if they are over moistened they loose their smel. For the same cause, if after a drought the Rain fals, at first a certain smel is perceived; because the dry is mingled with the moist: but the smel lasts only so long as until the drines overcomes the moisture; but if the rain continue so long, that the drines is vanquished by the Moisture, the smel also ceases.

the Efficient cause of smel.

They hold the efficient cause of smels as of al works in mixt bodies to be heat, which in due measure and manner mixes the moist with the dry. And hence they give the cause why most things that have smel, smel strongest when they are hot; why some things smel not at al unless they be heated; and why most things smel more in the day than in the night, in the Winter than in the Summer. For when in the mixt body moisture does very much abound, or drines is not rightly mixed with the moisture; there arises either no smel, or one which is imperfect. And that therefore there is need of heat, which may either consume the overmuch moisture, or mingle the same with the dry parts after a due manner.

But seeing what *Scaliger* saith of Tasts, *Exercit.* 279. *Sect.* 4 That Tast no more arises from the first Qualities than Laughter, is most true of smel: they labor in vain, who endeavor to draw smels from the first Qualities; since they are not in the power of the first Qualities, and we must have recourse to nearer principles. And the Chymists do far more probably deduce odors from Sulphur, and hold that Sulphur is the prime subject of

ſmels; of which we have ſpoke elſwhere in our Treatiſe of *the Conſent and Diſſent of the Chymiſts with the Ariſtoteleans and the Galeniſts, chap.* 11.

Differences of Odors. The differences of Smels are little known; but becauſe the Taſt and Smel are of kin, and moſt ſmels have much affinity to taſts, the names of taſts are alſo given to ſmels. Now the Taſts do follow the Nouriſhment, which is examined thereby by Creatures that eat the ſame; and therefore theſe ſavors of themſelves bring no pleaſure or diſpleaſure, but only by accident, as they are ſigns of good or bad nouriſhment. Hence the greatie ſmel of roaſt-meat is delightful to the hungry. Theſe odours are exquiſitely perceived by Bruits, and therein they excel Man-kind.

Yet there is alſo another kind of ſmels which does not follow the Aliment, but is of it ſelf pleaſant or unpleaſant, as the ſmel of Spices and many other things. And with theſe ſmels, as alſo the beauty of colors, Men are either only or chiefly affected: and other Living Creatures how exquiſitely ſoever they ſmel other ſcents, yet herein they are far outgone by Man-kind; ſo that either they take no delight from ſweet ſmels, or if they do, it is very imperfect and maimed, and agrees but to a few of them. Of which ſee *Scaliger* in *Exercit.* 303. *S.* 2.

From what hath been ſaid is not hard to judg what is the true object of ſmelling, and after what manner ſmels are perceived by the ſenſe of ſmelling. That Odours are the object of ſmelling was ſaid before, nor does any man deny it: but how that is to be underſtood, is not ſo manifeſt. *Heraclitus* (as *Ariſtotle* ſaies) *de ſenſ. & ſenſibil. cap.* 5. Many ancient Philoſophers, *Galen* and very many Phyſitians are of Opinion, That the ſenſe of ſmelling is not only affected by ſome ſpiritual image and repreſentation, but that a certain corporeal, aerial, thin exhalation does flow out of ſmelling things, and is perceived by the ſenſe. Contrariwiſe, the greateſt part of Peripateticks are of opinion, that a naked image of the ſmel does ſpiritually flow from the odorous body, as an image from a thing viſible, and is carried to the organ of ſmel, and thereby perceived.

Odors are not ſubſtances. The latter Opinion ſeems truer to us, provided it be rightly explained: yet that there is ſome truth in the former cannot be denied, though in ſome part it ſwerve from truth. For in the firſt place, this muſt of neceſſity be allowed, That odours are not ſubſtances, nor any thing corporeal: For the ſenſes do not perceive ſubſtances, but only their accidents. Again, this alſo hath been ſhewn before; That no ſenſe is affected by a real or material quality, but only by its repreſentation, or a ſpiritual and intentional quality as they cal it. And therefore we muſt alſo hold the ſame as to the ſenſe of ſmelling, that the ſaid ſenſe perceives nothing corporeal, nor yet any real quality, but only the Image thereof.

The ſmelling perceives only an image.

Nor muſt we in the next place deny that ſomwhat does flow from and exhale out of ſuch things as ſmel, and is carried in the Air. For dayly experience teaches, That odoriferous exhalations do ſundry waies affect the Brain, and very often change the temper thereof, and ſomtimes qualifie and rectifie the ſame, other whiles cauſe heavineſs of head, as *Hippocrates* hath it in his 5. Sect. of Aphoriſms, Aph. 28. Yea, and this comes not to paſs in the Brain only, but many times by odorous exhalations we perceive our Noſtrils, Eyes, and Face to be gnawn as it were, and pained. Moreover, we ſee that odoriferous things by little and little do for the moſt part waſt and conſume away. And when an odoriferous thing is taken away, the ſmel remains many times a long while after in the Air, which cannot be done by the images alone, which do not remain when the object is removed. Al which things teach, that oftentimes there flows from odorous bodies a certain corporeal exhalation, which hath a power of heating, cooling, and doing other things, which cannot be effected by bare ſpecies and images. This therefore we grant, That from many things a certain odoriferous vapor exhales, and that corporeal ſavory vapors do flow from things that have ſmel: but yet we avouch that a ſpiritual ſpecies is required and preſuppoſed to cauſe the ſenſe of ſmelling. But whether or no both are alwaies neceſſary, and whether the ſpecies of the Odor, which is properly perceived by the ſenſe of ſmelling, is alwaies joyned with ſome corporeal ſubject or vapor, without which it cannot be carried to the Organ of Smelling, is yet in doubt, and this is the main hinge of the Controverſie.

Whether the ſpecies of ſmel need alwaies the carriage of a vapor.

We have ſpoke before in *cap.* 1. of the difference of ſenſible ſpecies, and have granted that odours for the moſt part are indeed carried to the ſmel with a corporeal ſubſtance: but we deny that this is alwaies neceſſary, and hold that the exhalation which comes from the odorous body does not alwaies reach ſo far as to the Noſtrils, yea, and that ſomtimes no ſuch thing comes from the odorous body, and that the ſmelling is cauſed by ſpiritual qualities and images, of the ſavors proceeding from the odoriferous body to the organ of ſmelling. For if that ſame vaporous exhalation ſhould be alwaies joyned with ſmels as their carrier,

Fiſhes

Fishes could perceive no smels in the water, nor could be allured thereby to seek the Bait: For since the nature of odoriferous exhalations does consist in a dry subject elaborated by heat, and the nature of exhalations is such as to ascend upwards, how should those exhalations come to the bottom of the water? or if they should come thither, how wil they retain their driness and the integrity of their nature in the water, since odoriferous things when wet are wont to lose their smel? Moreover, how can there be so great and so long an efflux of vapors from odoriferous things, as may suffice to fil most large spaces? The whol odoriferous things verily which are but smal many times, if they were al turned into vapors, could not fil such distances. Yea, and we see many things do smel a very long time together, and yet are not at al consumed or wasted.

whether Odours nourish?

From the Premises also that Question may be explained; Whether Odors can nourish a man? For seeing the nourishment of a body ought to be a body, and we are nourished with the same things whereof we consist; and odors are qualities; we hold that they have no power to nourish. And whereas it is said that sick persons are many times refreshed with smels, and that *Democritus* for his sisters sake (whom he would not draw from the Feast of the Thesmophorist) did prolong his life three daies only by smelling to hot Bread; that must not be attributed to smels, but to odoriferous vapors exhaling from the Bread, and re-creating the spirits. Nor is that true nutrition which is made by apposition of a like substance, viz. Of Blood elaborated in the Liver; but only a certain cheering of the Spirits.

what is the Organ of the smell?

As to the Organ of Smelling, though al agree herein, that the Nostrils are the Instrument of smelling; yet it is controverted betwixt the Physitians and Peripateticks, what is the chief Organ of smelling. For the most Peripateticks do hold the proper Organ of Smelling to be the Nerves dilated in the Nostrils. *Galen* holds smel to be produced in the foremost Ventricles of the Brain, in 8. *de usu partium, cap.* 6. *de olfactus Instrumentis, cap.* 4. Other Physitians say, That from the Brain neer the Cavity of the Eyes, two Channels are derived to the bored bones of the Nose, whose ends seem like teats (whence they are called the mammillary or teat-like productions) and that in them as the proper instrument odors are discerned. Which Opinion is most agreeable to truth, and the greatest part of the best Physitians do follow the same. For the Brain is not the proper Organ of any external sense, but the common, as supplying spirits into the organs of the external senses, As to the Nostrils, true indeed it is, That odors are perceived by them alone, and that these are the only waies Nature hath appointed to carry smels to the Organ of Smelling: yet the perception and judgment of Odors is not in them, but in those mammillary or Teat-like productions, which are placed before the Ventricles of the Brain, as the examiners of smels. For if we attribute the faculty of perceiving Odors to the Nostrils alone, and the Nerves in them dilated, what should hinder us from smelling, so long as we have our Nostrils? Yet Experience shews, That when those processes are obstructed, as is wont to happen in the *Coryza*, the Smelling is either abated or quite taken away, without any fault in the Nostrils. Moreover, if Smelling were made in the Nostrils, we should perceive smels without breathing; whereas nevertheless we find by dayly experience, that the most odoriferous things being put to our Nose, we smel nothing unless we draw our breath; the reason whereof is, because those mammillary processes are placed within the Skul, so that smels cannot come thereto save by attraction of the Air.

The Medium of smelling.

The Medium through which Odors are discerned, is the Air and Water. As to the Air there is no doubt. But that in the Waters also smels are discerned by Fishes, this is an argument, that Fishes are allured by the smel of Baits; which *Aristotle* proves by many examples, in his Book *de Histor. Animal. Lib* 4. *cap.* 8. And so much may suffice to have said of the Sense of Smelling.

Chap. 5. *Of the Tasting*

The Definition of tasting: wherein tast differs from feeling:

THe Taste is an external Sense, by help of the Tongue discerning savors. Which sense though some confound with feeling, and make it only to be a sort of Touch: yet they are questionless in an error, and we must acknowledg the Taste to be a peculiar Sense. For although the touch is sometimes generally taken for a sensitive power, which takes cognizance of an object, not removed but applied to the Organ (and in this manner the Taste may be called a kind of feeling, and so it is by *Aristotle* in that sence called) for it does not perceive things distant as the sight does colors, but only savors applied to the Tongue: yet that

that signification is not so proper; and the Question is, whether the Touch be the same Sense, with that power that perceives Tangible Objects: which is denied. For they differ both in the Object and Organ: for the Object of the touch is tangible Qualities, but of the Tast Savors: and the tast may be lost in the Tongue, while the Sense of Touching remains entire. And therefore their Organs are quite different; and though in the Tongue there be Touch, yet where ever there is Touch there is not Tast; but only in the Tongue; whose thin soft and spungy flesh, the like whereof is not in the whol Body, is the proper Instrument of Tasting.

The Object of Tasting is Savor. Touching the nature whereof, we pass over the Opinions of the Ancients, *Empedocles*, *Democritus*, *Leucippus*, and *Anaxagoras*. The Peripateticks do thus teach concerning Savor. No simple Body hath any savor or tast, it being only an adjunct of mixt bodies, and thereto three things are requisite: an earthy drineſs, a watry moisture, and Heat which is the Author of all operations in mixt bodies: Of which we have every where frequent signs and tokens: For Water which of it self is tastless, if it be strained through some earthy dry substance, it becomes savory, as appears in Fountains, which receive divers tasts from the parts of the Earth through which they flow: and the water of Lye is bitter, because it is strained through Ashes. Howbeit the Nature of tast consists more in moist parts than in dry: and it is a quality affecting the tast, arising in mixt bodies from the permistion of a watry moisture with a dry earthiness. And seeing the mixture of moisture with drineſs is various; and the watry moisture joyned with earthy drineſs which is the subject of Tasts is various, somtimes thicker, somtimes thinner, and the Heat which is the Cause of tasts is somtimes stronger, otherwhiles weaker, hence also sundry tasts do arise which are severally reckoned up, by several Men. Most do acknowledg chiefly seven simple tasts or savors; and from their commixture others may arise, or at least they may be referred to them: Sweet, Sour, Harsh, Rough, Salt, Bitter, Biting. These tasts may be considered two manner of waies, either in respect to the first Qualities Heat and Cold, or to the sense of Tasting which they affect.

Kinds of tasts.

The former way they are chiefly considered by Physitians, and they serve them to know the Qualities of medicaments by, and are divided into Hot and Cold. Into three Cold, Sour, Harsh, Rough; three Hot in excess, the Biting, Salt, and bitter, and one moderately hot, *viz.* Sweet. And thus with Physitians the Harsh and Biting tasts are the extream tasts, the former the Coldest, the latter the Hottest of all others. The Philosopher considers them rather after the latter manner, and takes not their difference from the tangible Qualities, but from the Effect whereby they work upon the tast: and thus because that tast which is most contrary to sweet is the bitter Tast, and the one is most pleasant, the other most unpleasant: therefore these two are by Philosophers counted the extream tasts, the rest are intermediate.

Sweet tast

The sweet Tast therefore is most pleasing to the Palat, arising from the mixture of a watry moisture with an earthy drineſs, made commonly by a moderate heat. Such is in Bread, Milk, ripe Grapes, Figs, Licoris, Sugar, Honey. Although in these also some degrees may be observed in heat, for some are hotter than other some; and those that come neerest a mediocrity are most fit to nourish a man.

A tart tast

An acid sharp tast consists in a matter thin and subtile, and arises from a weak heat, or because in the mixture there are many watry parts which cannot be overcome by the Heat, or because out of the mixt body the hottest parts, especially those that are most pure, namely the Aery, are exhaled. Such a tast is in Vinegar, Sorrel, Juyce of Lemons.

An harsh tast

An harsh tast consists in a matter indifferently thick, and ariseth from a greater degree of cold, and a weaker heat than the Sour.

A rough tast

If the matter be yet thicker and the Heat weaker, and the Cold stronger, it causes a rough tast, which is in some unripe Apples, in Acorns, and Galls.

Salt tast

A Salt Tast is in an earthy matter, not subtile, but rather thick and earthy: and it arises from an heat exceeding mediocrity. And therefore the first subject of a Salt tast is an earthy drineſs, through which a watry moisture is strained, adust, so that little of the watry humor remains therein: yet from a smal portion thereof a great quantity of Water may be infected.

A bitter tast

In a bitter tast Heat is commonly yet greater, and its matter drier and more earthy.

The biting tast

Finally from the greatest heat arises the biting Tast, and it consists in a subtile matter: and therefore things so tasted have a faculty of burning, penetrating, and drying; such is in Pepper, Ginger, Garlick, Onions.

Thus I say, the Peripateticks and the Galenists endeavor to deduce the kinds of tasts from the first Qualities. But as was said before from the *Exercit.* 297. *S.* 4. of *Scaliger*, Tasts

do

do no more arise from the first Qualities than Laughter. And what lost labor it is to endeavor to give a reason of Tasts from the first Qualities alone, is learnedly shewn by *L. Grillus* in a peculiar Book *de Sapore amaro & dulci.* The Chymists more probably draw tasts from Salts, and teach that Salt is the first subject of Tasts, and that from the several kinds of Salts proceed the sundry kinds of Tasts, of which elswhere in my *Tract. de Consens. et dissens. Chym. cum Aristotelicis & Galen Cap.* 11.

The Medium of taste.

There is no external Medium required to tast, but if the tast of any thing is to be discerned, it must be applied to the Tongue. Yet the Internal medium is a spungy or rather porous Skin drawn over the Tongue, and the moisture of Spittle. For to this part the Tast is first communicated, whose representation is afterwards carried through the pores of the Tongue into the flesh thereof, and is there perceived by the Soul exercising the sense of Tasting. *And so much for the Tast.*

Chap. 6. *Of the Touch.*

The touch.

THe last external Sense and the most common of all the rest, is the Touch, which perceives tangible Qualities. Touching this sense, no smal Questions are wont to be agitated. And in the first place they are wont to enquire; whether the Touch be only one Sense in number,; or whether there be one power of Feeling, as there is one of Seeing, one of Hearing, one of Smelling, one of Tasting, or more. *Aristotle* moves this Question in 2. *de Anima Cap.* 11. and brings this reason of doubting. There is one Sense of one first Contrariety: and one Sense hath one proper Object, to which all that it perceives may be referred: But the Touch seems not to have one common Object, but many: for it perceives Hot, Cold, Dry, Moist, Heavy, Light; Hard, Soft; Clammy, Brittle; Rough, Smooth, Thick, Thin; which cannot be reduced to one common kind, or one common notion, according to which they are perceived by the Touch. Many being perswaded by this reason, have held divers Tasts; some two, one to perceive Hot and Cold; another to perceive Moist and Dry; others three; the two aforesaid, to which they attribute also Hard and Soft, Rough and Smooth; and a third to perceive Lightness and Heavines: others hold that there are so many senses of Feeling, as there are differences and contrarieties of tangible Qualities. Others have yet added more senses of touching, to perceive Pain, Pleasure, Venery, Hunger, Thirst. Others contrariwise do hold that there is one only Touch or Sense of Feeling, which though it hath divers Objects, yet it perceives them all under some common notion; just as the Sight perceives White, Black, Red, Yellow, Green, under the common notion of Colour.

Whether there be but one Sense of Touching.

Now although it be hard to compose this Controversie, and most learned men have held, that no certainty can be determined in this Point: yet very many have thought it most probable that there is only one faculty of touching. And several men have severally endeavored to reduce the sundry differences of tangible Objects to some one common Nature. For some say, though the Object of Feeling be manifold: yet is it contained under one common kind, though it want a name. And that it is a Quality that primarily follows a body as a body, or which immediately depends upon sublunary Bodies, and necessarily accompanies the forms of the Elements, and of the bodies of them compounded. Others also attribute to tangible Qualities one manner of affecting the touch, and that they say to be a changing of the complexion of the first Qualities, and hence the sense of feeling is said to be a sense of the temperament: and that therefore the first Qualities are the chief object of feeling, and the rest pertain thereto after a secondary manner; and such things as cannot be reduced to these, are common sensible objects, which constitute no peculiar sense. Finally, others distinguish betwixt the external sensibles, such as are Hot, Cold, Moist, Dry, Hard, Soft, &c. and betwixt the internal, which are perceived in the Feeler, as Pain, Pleasure, Hunger, Thirst. They conceive the external are perceived by one only sense. For although they are many, yet they may be reduced to one common notion: and indeed we find by experience, that he who can by touch perceive one of those contrarieties, he can also feel the other by the same part: contrariwise he that cannot feel one of them, cannot feel the other. But they hold that Hunger, Thirst, Pleasure, Pain Corporeal, are discerned by another power; seeing these powers and acts are so separated, that in the part wherein the external are perceived, Hunger, Thirst, and such like are not perceived.

As

the Organ of feeling: As to the Organ, it is not so easie to find it in this Sense as in the rest, and there are very great Controversies hereabouts, not only among the ancient Writers, but the later also: for some hold the Flesh, others the Skin, others some other thing to be the said Organ: but we conceive the true Organ of Feeling is a Membrane. For where-ever there is a Membrane, there is also Feeling; and where there is no Membrane, there is no Feeling. Hence the Brain feels not save by means of the Membranes; and the Membrane which compasses the bones being removed, the bones themselves have no more feeling. Moreover, because the Touch is a Sense most common, and is given to Living Creatures in their whol Bodies, to avoid the external injuries, therefore its Organ was to be spread al the body over, and that such an one as should have no other office in the Body: for every Sense hath its proper Organ. But if we consider al things in the whol Body, al have peculiar offices save a Membrane: the Nerves carry animal Spirit, the Veins Blood, and other parts (as is known) have other uses. And therefore this office cannot be assigned to them; and there remains only the Membranes which are both similar parts, and have no other use, but are given to Living Creatures only, that they might be the immediate Instrument of Feeling.

Chap. 7 *Of the Internal Senses.*

HAving explained the External Senses, we come now to the Internal, which are busied about matters sensible presented by the external Senses. For this is the chief difference betwixt the internal and external Senses, That the external are immediately affected by an external object, whence also they are called External: But the internal are not moved by the external sensible object immediately, but they are moved by the external Senses; and therefore they are called Internal. But as touching the Number of the internal Senses the Controversie is so great (as may be seen in *Francisc. Piccolhomineus, de sens. intern. cap.* 3, 4, 5, 6, 7. Francisc. Toletus *in Lib.* 3. *de Anima, cap.* 3. *Qu.* 6. Collegium Conimbricense *in Lib.* 3. *de Anima, cap.* 3. *quest.* 1. *Artic.* 1, 2, 3.) that it is a hard matter for a man to disintangle himself, being herein engaged. We retain the common Opinion, which is the most probable, and acknowledg three internal Senses, from the diversity of Offices and Works by them performed, viz. Common Sense, Phantasie or Imagination, and Memory.

the internal senses are three:

Common sense We must by al means hold a common Sense: For since Animals do know the differences betwixt the proper objects of sundry Senses; and the external Senses cannot perform this Office; since each of them knows only its own peculiar object: of necessity we must hold there is some internal Sense, which apprehends the objects of al the external senses (whence also 'tis called the common Sense) and discerns one from another, and does know that color differs from sound, sound from smel, smel from tast, tast from what is hot, that which is hot from that which is black, &c. For the chief Offices of the common Sense are, to perceive the objects of al the external Senses by help of the said Senses; to know and perceive that we are sensible of this or that; to know the difference betwixt the divers objects of the Senses; to judg the privation and absence of the objects, as of darkness, silence, &c. to move the Phantasie and to offer Images and representations of things thereunto. This Sense therefore is as it were the middle stickler betwixt the Senses internal and external, and receives images from the external, and communicates them to the rest of the internal. Whence it is not unfitly compared to the Centre of the Circle, wherein five Lines concur and meet together.

Phantasie: Besides the common Sense the Phansie must also be added. For since in perfect living Creatures it is not only necessary to apprehend things present, but also diligently to consider that which is no longer present, that they may be incited either to seek or shun the same; among the internal Senses we must also reckon Phansie, which may retain the sensible representations perceived by the common Sense, or framed by it self, and diligently examine the same. And although it be altogether necessary, that the Phansie be first moved by the external Sense; yet after it hath once perceived the object, and hath committed the image thereof to the memory, afterwards even in the absence of the external object, it can as often as it list review and imagine over again the same image. But of necessity the Fansie must first be moved by the external Sense, and we can imagine nothing which we had not before perceived by the external Senses. And though we may imagine a Mountain of Gold and the Monster called a *Chimæra*, which we have never totally seen; yet we have seen them

them by piece-meal; and except we had seen Gold and a Mountain we could not imagine a Golden Mountain: so unless we had seen a Lyon, a Goat, and a Dragon, we could not imagine the *Chimæra* or Monster compounded of al those Beasts.

the Memory:

Finally, among the internal Senses the Memory is to be reckoned: For because the Fansie without knowledg cannot receive the species or representations of things; and it cannot take cognizance of many things at once: therefore there is need of a faculty, which it self does not take cognizance, yet is subservient to cognition, that is to say, which may receive divers sensible representations known by the Fansie, and reserve the same, and suggest and present the same thereto again when need is. Also Experience it self does witness, that in diseases of the inner Senses, one of them may be lost and destroyed or depraved, the other remaining safe and sound: and in Feavers it often happens, that the Patients their Memory being sound, do imagine that there are Fidlers and other things in their Chambers, and seek to pick flocks and feathers or straws where there are none: and such like examples are frequent in the Writings of Physitians: which is an argument that the Fancy is a faculty distinct from the Memory.

A twofold Memory.

Now some do make a twofold Memory, Sensitive and Intellective: but it is enough to say that the Memory is a Faculty common to Man and Beast. But after what manner the act of remembring is performed, is a very obscure point. They commonly hold that sensible objects do imprint certain images on the Brain or Organ of Sense, even as in Wax the Picture of the Seal is imprinted, which remains after the Seal is taken away. Whence they say, such as have an hard and dry brain have an hard apprehension of things, but retain them longer; but they that have it moist and soft, do easily receive, but cannot so long and faithfully retain.

But it is (peradventure) more advised to confess that in this point we are in the dark, than to hold such things; especially if you weigh that which *Scaliger* hath, in his 397. *Exercit. Sect.* 28. against this Opinion. For if Memory be made after this manner, since it is in a manner Infinite; in what spaces can so many Images be retained? in what seats can they be so disposed and ordered, that we may draw out, rank, direct, every one apart, and al together. Now why a dry Brain is more apt for Memory, *Scaliger* brings a new cause in the place forecited, which may there be seen.

Two acts of Memory.

1 Memory.

2 Remembrance.

Now there are two acts of Memory, or of the remembring Faculty: the one of which is called by the name of the Faculty, Memory; the other Remembrance. Memory is defined to be the iterated apprehension of a thing formerly known; or a repetition of what hath been formerly perceived by the Senses, just as it was perceived: For examples sake, if I am asked what's the name of the King of *France*, I can suddenly recite the same, as I have sometimes heard it named. But Remembrance is to go back from one or two things retained in the Memory, til we cal to mind somwhat which we had as it were forgotten: as if a man having forgotten a name, should go over al the Letters of the Alphabet, and joyn every Consonant to each Vowel once, and so make single syllables, til meeting with the first syllable thereof, he come thereby to cal to mind the whol name which he had forgotten. And therefore more things are required to Remembrance than to Memory; and Memory is common to the Bruits, but not Remembrance: For to Memory it is enough that we apprehend a thing again, after the same manner as we received it: but to Remembrance it is requisite, that the thing be first forgotten, and then that we hold another thing fast in Memory, whereby we are brought again to the knowledg of what we had forgotten.

Nor does it seem necessary to hold any more internal Senses. Some indeed do add the Æstimative, to discourse from that which is known to that which is unknown in particulars, or to perceive those things which the Senses could not perceive: for examples sake, when the Sheep sees only the color, bigness, and shape of the Wolf with its eyes, and yet does not for these things fly the Wolf, they conceive it necessary to add an Æstimative Faculty, whereby the Sheep discerns the enmity of the Wolf against it self, which fals not under cognizance of the external Senses.

But this Opinion seems not agreeable to truth: For the Faculty of Reasoning and Discoursing is only in Man alone; and for the apprehension of al sensible things, the Fancie alone is sufficient: nor must we hold a peculiar faculty which they cal *Æstimativa*, because of the enmity, pleasure, hate, or pain which Animals perceive from some things. For these are nothing in the sensible object it self, but passions and affections following upon the perception of a thing, and proceeding from a certain proper natural Instinct which is granted to living Creatures to stir up the appetite, either to seek or shun the object. For in the perception of al sensible things, these three things do follow one another in order: First the

perception of a sensible object under the proper notion of an object: Secondly, pain or pleasure arising from the said perception: Thirdly, a stirring up of the Appetite, which either seeks the object as pleasing, or shuns the same as displeasing. The two former do pertain to the same faculty, viz. The sense or Phantasie, yet with some diversity. For the Apprehension of the object under its proper notion, is the work of the Sense as Sense, and the Fancy as Fancy; and al Living Creatures do perceive the object under the notion of an object after the same manner, both with the external Senses and the Phantasie: as al Creatures discern a white color as white, none as black. But the Apprehension of the object as pleasing or displeasing, is not of the Sense as Sense, nor of the Fancy, nor do the same things seem pleasing or displeasing to al Living Creatures: but this belongs to the Senses as they are limited and determined by the proper form of every Creature; which because it is for the most part unknown to us, is by some called natural Instinct. Hence the sight of a Wolf is painful to the Sheep, which yet it is not to the Lyon, but rather a delight if the Lyon be hungry.

This Question is by *Zabarella* thus explained. But it may to the same purpose, yet peradventure more cleerly, be thus briefly resolved. In al living Creatures there is not only the Vegetative and sensitive Soul; but also as was said before a certain peculiar specifick form, whereby every Living Creature differs from others of another kind, as for Instance whereby a Lyon differs from a Man, an Horse, an Ox, &c. This in Man-kind is the Rational Soul; and in Bruits also, it is a peculiar soul, which though it be not a rational soul, yet it answers to the Rational Soul in Men, and is in some more noble, in others less noble; and to this al those more noble operations, which cannot be referred to the Senses, and are different in several Creatures, are to be ascribed.

And therefore their Doctrine is not true (among whom is *Piccolhomineus, de sensibus internis, ch.* 11.) who hold that it is one of the Offices of the Fancy, to ad submotions, and to judg the objects to be agreeable or disagreeable to the Creature; also that it is the principle of sundry admirable works, which irrational Creatures perform, as the Swallows making her nest, the Spiders weaving her web, the Bees making her Honey-comb, &c. For as in Man, to reason is not a work of the Fancy; so in Bruits it is not the work of Fancy to act such things as are proper to their kind, but of a superior faculty, whereby every Bruit is distinguished from other Bruits.

whether brut beasts are ratioval?

Hence that Question of some may easily be decided, Whether Bruits are Rational or no? That they are not Rational is certain, because they are not Men. Mean while as a man not by his Fantasie, but by Reason is differenced from other Living Creatures: so the soul and specifick form of every Bruit hath a proper faculty above the Fancy, whereby it differs from other Bruits. And hence there is so much variety in the actions and works of Bruits, and some are more ingenious and crafty than other some; the Fox than the Hog, Ox, or Ass; the Bee than the Fly: Of which matter he that would rightly judg, let him consider what is written of the Works of Elephants, Dogs, Silk-worms, Bees, &c. and what dayly accurs in Nature.

Chap. 8. *Of the Desiring and Moving Faculty.*

HAving treated of the knowing Faculty of the Sensible Soul: we are now to speak of the Appetite. And although there are sundry Appetites, and as *Scaliger* in *Lib.* 1. *de Plantis*, writes, the Fire is said to have an Appetite to mount aloft, the Iron to joyn it self to the Load-stone, a Plant to augment its moisture, an Horse to Venery, a Man to blessedness; yet here we treat only of that kind of Appetite which they commonly cal Sensitive; which is a power of the Soul, whereby a Living Creature hath an inclination towards something perceived by the sense. Its object is some good thing apprehended by Sense, whether it be really good, or only appear so. For the Appetite tends to an end; and every end hath in it the notion of goodness. But although the Appetite is said to seek good, and fly from evil: yet evil also belongs to the Appetite under the notion of good; for to fly evil seems to the Appetite a good thing. From the Appetite as its acts proceed the Passions and Affections so called.

what the Appetite is

The Motion of living Creatures.

The Appetite of Living Creatures is followed by their voluntary motion; for unless the Creature had a power to attain what the Appetite desires, it were a vain thing for it to have an Appetite; but Nature doth nothing in vain, but hath granted a faculty to Animals springing

ging from the Senſitive Soul, whereby they can tranſfer either their whol Body, or ſome part thereof, from place to place.

Now to cauſe this Motion, five things are neceſſary. *Motion how cauſed.*

I. An Object, which may excite the Creature to move, and for the ſake whereof it is moved. For a Living Creature is not moved in vain: but the Appetite is ſtirred up by the Object as its end and good thing deſired.

II. There muſt needs be a directing Principle by which (being in the living Creature) the firſt motion is made. For voluntary motion is given to living Creatures, to ſeek out things profitable, and to fly things hurtful; which cannot be done, unleſs there be ſome power which may know the Object, and offer the ſame to the Appetite, and incite the ſame either to ſeek or to ſhun the ſame. And therefore this principle ought to partake of knowledg. Moreover, becauſe a living Creature is moved not only to things preſent, but abſent alſo; it ought to perceive not only things preſent, but ſuch alſo as are abſent. But theſe conditions do neither ſuit with the nutritive Soul, nor the external Senſes, nor the common Senſe: but only with the Fancy. For although the mind alſo may direct to Motion: yet it is a more remote principle of motion, nor does it move without the Fancy; whereas nevertheleſs the Fancy may move without the Mind; as we ſee in Bruits, which though deſtitute of Reaſon, yet are they incited to motion by their Fancies.

III. To come a little neerer, the Principle of Motion and that which commands the Motion is the Appetite. For becauſe the motion of Animals is made to follow after ſome things profitable and convenient, and to fly ſome things adverſe and noxious; and that to the Appetite belong the affections of Love and Hatred: of neceſſity in the next place the Locomotive or ſtirring Faculty is moved by the Appetite, ſo that the Appetite commands Motion.

IV. Beſides the Appetite, there is need of an executive power, which may produce into act that motion which is commanded by the Appetite, and perform the ſame. For ſince Local motion is a different operation from the operation of the Appetite, and the operations of the Appetite are immanent, but motion a tranſient action: another power muſt be granted, which is the immediate cauſe of Local voluntary motion in Animals.

V. Finally, An Inſtrument is requiſite by which the motion may be performed. For Experience ſhews, that thoſe who have ſome Member maimed, although the object be at hand, and the Fancy do move the Appetite, and the Appetite command motion, yet they cannot ſtir, becauſe of the unfitneſs of the Inſtrument. Now though there is ſome Controverſie among Authors, what is the Inſtrument of Motion; yet we hold that it is a Muſcle. And whereas ſome make anxious Inquiſition, which part in a Muſcle is the chief Inſtrument of motion, whether a Nerve or a Tendon; they ſeem herein to buſie themſelves more than they need. For, as *Ariſtotle* hath it, 2 *de Part. Animal. cap.* 1. The power of ſenſe is in the ſimilar parts, but the Actions are performed by parts diſſimilar.

The manner and order of the motion of a living Creature.

The voluntary motion therefore of a Living Creature is made after this manner and order. In the firſt place an external object is offered, which as an immovable mover, being received by the external Senſes and the common ſenſe, is communicated to the Phantaſie, and is thereby known what it is. Afterward more attently and punctually it is known whether it be convenient and acceptable, or hurtful and unpleaſing. This knowledg is followed by Love or Hate, or an Appetite to lay hold on a thing grateful and delectable, and to avoid a thing hurtful. This Appetite in Bruits is preſently followed by motion.

But in Man, before motion be made, ſome things do yet intervene. For the Appetite and theſe motions of the internal Senſes are offered to the Mind, that they may be thereby approved or diſapproved. If they be approved, and the mind underſtands that the Appetite of the Senſes is right, preſently motion follows: but if it be rejected as falſe, a contention and fight ariſes betwixt the ſenſitive appetite and the rational, til the one vanquiſhes the other; and that which overcomes is the principle of the motion, and commands the motive faculty to move. The motive faculty being implanted in al the Muſcles of the whol Body, does contract ſuch Muſcles as are needful: the Muſcles being contracted draw the Tendons to them, the Tendons being drawn draw the Bones: finally, the Bones being moved, the Member or whol Body is tranſferred from place to place.

Chap. 9. *Of Sleep, Waking, and Dreams.*

SLeep and Waking are Affections of the Senses hitherto explained. For we perceive a Man is awake, by the exercise of his external senses; and that he is asleep by their cessation from operation. And therefore sleep seems to be a privation of waking: and sleep and waking belong to the same faculty, *viz.* the sensitive: and sleep and waking are affections of the sense, agreeing to all Animals and to them alone. And therefore things destitute of a sensitive Soul neither sleep nor wake, as Plants. Again no Living Creature doth alwaies sleep, nor alwaies wake. For because al things must necessarily be weakned in their Operations, and the Spirits are consumed by the operations of the Senses; Sleep is also necessary to repair the strength and restore the Spirits. And though this be not so manifest in the more imperfect Animals, which are not furnished with all their Senses; yet manifest experience convinces that the more perfect Animals do sleep. Of which see *Aristotle* in his 4. *de Hist. Animal, cap.* 10. *Pliny* in *Lib.* 10. *Nat. Hist. cap.* 75.

the Cause of Sleep. Now Sleep is not every cessation of the Senses, or impotency in the exercise of the Senses: for even in swouning fits also, and other Diseases, the operations of the Senses cease: but when there is an inability to operate in the first Organ of Sense. Sleep therefore is a natural cessation of the common sense and the other senses, caused for the good of living Creatures, or as *Aristotle* saies in his *B. De Somn. & Vigil. cap.* 3. *It is the Cessation of the first original of sense, as being unable to act*, of which definition see *Scaliger* in *Exercit.* 289. Now the common sense is chiefly affected in sleep; and it resting the other external senses rest also. But the other internal senses do not alwaies necessarily rest in sleep: but if they do, it is because the external rest. For if the Fancy doth sometimes not operate in sleep, that doth not therefore happen because sleep is an affection or adjunct thereof, but because there is nothing brought unto it from the external senses to busie the same.

Now what the Cause is which thus binds as it were the external senses, is worth our Enquiry. The cause whereof is nothing, but that the animal spirits do not flow from the Brain into the Organs of the Senses. But what should hinder the Influx of the spirits is somwhat obscure. *Aristotle de Somno & Vigil. cap.* 3. held that this was caused by obstruction of the passage of the common sense, through which the animal spirits as a common Instrument of the Soul are sent into the Organs of all the senses. Now the obstruction he saies is caused by vapors, chiefly such as are carried out of the Stomack into the Brain. For they when the living Creature rests, whereby the Brain becomes somwhat colder, are condensed, and become more thick and heavy, and so begin to descend again, and stop the passages of the Nerves, so that the animal spirit cannot be carried into the Organs of the Senses, of which thing there are many tokens: for after meat, especially if we have eaten liberally, we become sleepy, and Persons that are drunk sleep exceedingly: contrariwise, such as have fasted long cannot sleep a nights, and most sleepy medicaments do send many vapors into the Head, or cool the Brain, that the vapors may be therein somwhat thickned, and so may stop the passages. Others contrariwise, conceive the sleep is not caused by vapors, nor by such things as stop the passages of the Nerves, but because the soul draws back the spirits to it self, lest by continual operation the animal faculties should be destroyed. Hence not only after Meat sleep comes; but Musick, Weariness, Darkness, and Quiet cause sleep.

But both these Opinions ought (I conceive) to be joyned together, and thus Sleep is bred. The living Creature being composed to rest, the Soul finding a kind of languishing feebleness, by reason of the operations of the senses all day long, dissipation of the spirits, and absence of the quickening heat of the Sun, endeavors a restauration and recreation of the strength and spirits to the preservation of the living Creature in Health. And because the animal spirits have their original from the Vital, that the Vital may first be restored and repaired, the Heart draws to it self some Heat, which is scattered into the other parts. Hence the remote members, and especially the Brain, becomes a little colder, to which the coldness of the nights Air, and the Ceasing of the bodies motion, which causes heat, do lend an helping hand: but the Heat about the Heart and parts thereabouts is encreased. The Heat there encreased raises out of the Aliment certain sweet vapors, which being carried to the Brain, by the coldness thereof are a little thickned, and begin again to descend; and slipping into the roots of the Nerves they fil and stop their passages, and are the cause, both that the vital spirits and Heat cannot ascend out of the lower parts into the Brain, and that the animal spirits

cannot

cannot be distributed into the Organs of the Senses: for want of spirits all the members do hang loose, and al the operations of the external Senses do cease.

the End of Sleep.

The End therefore of Sleep is to restore the strength of living Creatures. For because much spirit is consumed by motion, and the operation of the external senses, that the Creature may not be endamaged in point of health, they must of necessity be restored. *Scaliger* in *Exercitat.* 289. adds another End, in these words: *Sleep was made by God, not only (as is wel said) to refresh and repair the Body, but for the Liberty of the Mind. For because if you regard the offices of life, when we sleep we live but the life of Plants; it was his pleasure that then we should truly live: For the Servant at that time is free, yea and becomes a Master sometimes in his Dreams. The Minds of evil men are punished in Dreams, those of good and wise men become divine, by the searching out of truth and performance of laudible offices. For being freed not from the Body, but from its service, they do their own work: for they move themselves, and also advance themselves to the Pattern of their End which they shal in time see face to face.*

Watching.

To Sleep, *Watching* is opposed, which is nothing but the Activity or Freedom of the Senses. Now a living Creature is wakened from sleep two manner of waies, either of its own accord, or being disturbed and troubled by some external Cause. The first manner is most natural, and comes to pass when the Heat which had hid it self within, for the digestion of the aliments, and reparation of the spirits (concoction being finished, and the spirits repaired) doth again break forth into the outward parts, and discusses those vapors which were an obstacle to the Spirits, that the Spirits may freely pass into the Organs of the senses. Now although sometimes the living Creature is awaked of it self, before concoction be finished (if sharp vapors arising from bad humors be carried into the Brain; or through some other Causes) yet this manner aforesaid is most common and natural.

Now the wakening of a man out of sleep by external things, (as if a man be rouzed by crying aloud and pulling) is caused by perception of external sensible objects. For although in sleep there is a defect of spirits in the Instruments of the senses: yet the Organs are not quite void of animal spirits, but there are some yet remaining in them, which are sufficient to perceive vehement sensible objects. Therefore the sensitive soul in sleep being stirred up and provoked by a vehement external object does begin to exercise its senses, and at first it obscurely perceives the object, but afterward that it may more clearly discern the same, it gives out a greater quantity of spirits; which seeking way to the Organ of that sense which is affected, they break through the passage of the common sense; and so way is opened to the Organs of al the Senses, and consequently the sleep ceases. Hence they who in sleep have the passages of their senses obstructed by many thick vapors, which is usual in such as are drunk; they are hardly awakened, nor can their spirits easily find their passage: but those who abound not with thick vapors are easily awakened. For the same cause the first sleep is more sound and deep; because the vapors in the first concoction are more plentiful and thick, which afterward are by little and little consumed and attenuated.

what a Dream is.

In sleepy Dreams do happen, which are no passion of the external senses. For in such as sleep (who only Dream) all the external senses are bound and tied up. Nor is a Dream a passion of the rational Soul: for Dogs and other Creatures Dream as wel as Man-kind. But a Dream is an adjunct of the internal senses, and especially of the Fancy: and it is defined to be a Phantasm or Apparition happening to such as sleep.

And because in such as Dream the Fancy is busied, and some apparition appears thereto; and we Dream not only of things which we have done in the day time, but also of things a great way off, and which we have neither seen nor heard, nor perceived by any of our senses, yea and of things never yet done, but which are hereafter to come to pass: The Question is how the Images of things absent, never perceived by our senses, and which are not yet come to pass, can be offered to our Fancy. The Epicureans held (as appears out of *Lucretius*, *Lib.* 4.) *That certain thin Images do come from the outsides of visible objects, which are as it were their Skins and Barks, having the representation of the things from whence they came.* And these they thought did insinuate themselves into Persons asleep, and foreshew things to come. But this Opinion hath been long ago rejected.

The conceit of *Cœlius Rhodiginus* is not much better, who in the 27. *Book of his ancient readings*, *Chap.* 11. denies that there are any such Images flying up and down in the Air, as the Epicureans imagined: yet grants that there are certain motions which exercise and work upon us in stead of Images, and that they do proceed from the Beginnings of certain things afterwards to be said or done, the Air being first changed, which being afterwards through

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the Noſtrils and Ears tranſmitted to the Heart, they cauſe us in Dreams to foreſee the events of future things. And that theſe motions cannot at any other time make themſelves ſenſible ſave in the night. But what motions can there be of things which are not? or how can things abſent fifty or a hundred miles al along affect the Air? or why ſhould not theſe motions affect any perſons that ſleep, but only ſuch as are concerned to know the thing revealed?

We refer all ſuch Dreams which are of things which we never before perceived with our Senſe, or ariſe from cauſes which are not in our bodies, unto a more Divine power. Thus therefore we conceive Dreams are to be divided.

The Differences of Dreams.

Dreams are ſome Natural, others Supernatural or Divine. The Natural are ſuch as proceed from Natural cauſes. And theſe again are by ſome divided into Animal and Natural peculiarly ſo called. Thoſe are called Animal which are converſant about ſuch things as have been preſented to us while we were awake. For certain ſpecies or Images of ſenſible things are imprinted upon the internal Senſes, which remain even then when the Senſes work not, and when ſenſible objects are abſent, and raiſe dreams. Theſe though they do not alwaies appear to perſons awake, being buſied about other objects: yet in perſons aſleep, the Senſes ceaſing to operate, they again ariſe, and preſent themſelves to the Fancy. Theſe Dreams do not alwaies preſent things to us juſt as they were acted: for nothing can be imagined ſo fooliſh, abſurd, and monſtrous, which is not preſented unto us ſometimes in Dreams. For the Soul being not wrought upon by external Objects, revolves the Images or things formerly preſented, and joyns this with that as each offers it ſelf, and of many and divers things compounds one; alſo it wonderfully confounds the order and circumſtances of things. And to this the plenty of bad vapors is a furtherance. For as bad vapors and humors in perſons awake, as in ſuch as are melancholy and mad, by diſturbing the Brain are a cauſe of abſurd cogitations; ſo they do the ſame in perſons aſleep; ſo that it is rightly ſaid, Dreams are the Ravings of perſons aſleep, and Ravings are the Dreams of ſuch as are awake. Hence melancholick perſons, and ſuch as have over eaten, have abſurd and terrible Dreams. And for the ſame cauſe, ſuch as are drunk, and thoſe that firſt compoſe themſelves to ſleep, have for the moſt part no Dreams; becauſe there is in them ſo great ſtore of vapors that their Brain is filled, and al the images overwhelmed: But towards day, and after the Meat is digeſted, the Dreams are more cleer, becauſe the vapors ariſing from the Meat are attenuated and for the moſt part diſcuſſed.

Animal Dreams.

Natural Dreams.

But Natural Dreams are ſuch as ariſe from ſome hidden cauſe in the Body, as the humors, temperaments, &c. For if ſuch a cauſe be vehement, it may even in ſleep alſo affect ſome external ſenſe, and preſent an image of it ſelf to the Fancy; yet it ſeldom does it diſtinctly, but by the appearance of ſome other thing like to it, or joyned with the appearance of a like thing. So, as *Galen* relates *de Præſag. ex Inſomniis*, when a certain man dreamed that one of his Thighs was turned into a ſtone, a while after unexpectedly he was taken with a palſie in the ſame Thigh.

Supernatural Dreams.

Divine Dreams.

But to Supernatural Dreams we refer al thoſe which are ſent into us by higher and ſupernatural cauſes; whether it be by God, good Angels, or Devils. Such as are infuſed by God and good Angels, are termed Divine, of which ſome examples are extant in the holy Scriptures. For the moſt good and great God is wont to preſent to men in Dreams, either new Images of things, or ſo to order and joyn ſuch as were in them before, that they may become warnings of things to come. Alſo the Angels are wont to excite and aptly to diſpoſe ſuch Images, Spirits, or Humors as are in the Body, as that they may admoniſh a man of ſome neceſſary and profitable thing. But Diabolical Dreams are cauſed after the ſame manner as the Angelical, but to a different end: For the Devil ſtudies to do men miſchief, and endeavors even by Dreams to poſſeſs them with vain Superſtitions; which the Oracles ſuggeſted in Dreams do witneſs; ſome examples whereof are related by *Tertullian* in his Book *de Anima*. *Cœlius Rhodigin. antiq. Lect. lib.* 27. *cap.* 14. or by ungodly and laſcivious Dreams he endeavors to allure men to luſts and unlawful pleaſures.

Diabolical Dreams.

From the Premiſes it is apparent how even abſent and future things may be preſented to us in a Dream. The Platoniſts conceive many Dreams may be cauſed by the Geniuſes and Spirits which they conceived did attend upon every man, and admoniſh them of many things; and the Divines refer them more rightly to Angels, which many think every man hath to attend him. But this ſeems fit to be added to what hath been ſaid out of *Tertullian*, who in his Book *de Anima* thus writes; the liberality of Divine Dreams is alſo wont to drop down upon prophane perſons, God making the Sun to ſhine upon the juſt and unjuſt. For even *Nebuchadnezzar* had a Divine Dream. And as Gods goodneſs vouchſafes it ſelf to Heathens,

Heathens, so also the tentations of the Devil do follow even holy men, whom he abstains not to tempt by day, or to molest when they are asleep, if he cannot do it when they are waking.

Touching Divination by Dreams.

From what hath been said it is ease to collect what we are to think of Divination by Dreams. For Dreams are either Significative, which foretel somwhat; or Nonsignificative, which foreshew nothing. Again, significative Dreams are either Theorematical, which cleerly expres the Nature of the Event; or Allegorical, which expres the thing foreshewed wrapt up in figures and Allegories. To explain these latter is not in the reach of every one; but they are the best expounders of Dreams, who can best discern the similitudes and resemblances of things: whereof the Books of Interpretations of Dreams do treat.

The Dreams infused by God and good Angels do questionles foreshew somwhat to come: but al cannot expound them, only they that have it granted them by God. Most Diabolical Dreams are vain, and sent to allure men to sin; and if any of them be true (for the Devil also can sometimes conjecture things to come, knowing them by their superior Causes or Signs) he does also by them endeavor to draw men to some false Religion. But Natural Dreams, which arise from the Constitution of our Bodies, do also afford signs thereof; and Physitians are wont to observe them; and what Dreams do argue such and such Constitutions of Body, is taught at large by *Hippocrates*, *de Insomniis*, and by *Galen* in his Treatise *de præsagiis ex Insomniis*: and seeing these are most frequent, it is wel said by the Preacher, *Ecclesiastes* 5. *In the multitude of Dreams and many words there is much vanity: but fear thou God.*

Chap. 10. *Of the Differences of Living Creatures.*

HAving spoken of the Form of Bruit Beasts, we should now speak of their Bodies. But forasmuch as Man of al Animals or living things (for we trouble not our selves whether these terms do differ, of which see *Scaliger*, *Exercit.* 216.) is the most perfect; and in every kind the more imperfect are to be judged by the most perfect: Moreover, the parts of al Animals or Living Creatures are not yet known and described; but in the description of the parts of Mans Body Anatomists have been as diligent as can be imagined: Such things as should have been said of the parts of Living Creatures in general, must be fetcht from the History of the parts of Man; and such things wherein the parts of other Creatures differ from those of Man, must be taken into consideration. We shal here therefore treat rather of the differences of Animals; where also some things wil fal in our way as touching their parts. And seeing every living Creature consists of a Soul and a Body, we wil weigh and consider the chief differences which flow both from the Soul, and from the Body, and from the whol Creature, consisting and made up of both.

The differences of Living Creatures in respect of the Vegetative faculty.

And first as to the Vegetative Faculty, three things are therein considerable: Nutrition, Augmentation, and Generation. And as for Nutrition, there is no Bruit Beast which does not eat some kind of food or other: for some eat flesh, as the Wolf, Tigre, &c. some eat divers kind of things promiscuously, as Dogs; some Herbs and Corn, as Horses, Harts, &c. some feed on Worms, as very many Birds; and some on Fishes. And of these again, some hunt for their living, and prey upon other Creatures, as the Crocodile, the Lyon, the Wolf, &c. some lay up their Meat in Summer, as the Pismires; some seek their Prey night and day.

As to Generation, Bruit Beasts have doubtles a Faculty (which they received from the blessing of God at the Creation) of multiplying themselves by mediation of a certain Seed, whether it be properly so called, or analogically, in such things as are commonly said to be produced by equivocal Generation. For we find by experience that Insects and such like things, which are said to be produced by equivocal generation, are not generated in any, but only in some peculiar sort of matter. For a Beetle is not bred of any, but only of some determinate sort of Matter. Hence also it comes to pass that Beasts generated of a putrid substance, containing therein a fitting Seed, are not found to differ from other Creatures of the same name. For besides that they agree altogether in form and figure, they do moreover possess the same proprieties, and perform the same operations, and can beget their like.

A threefold Generation of Living Creatures.

For living Creatures are produced three manner of waies: Some by a mutual Conjunction of male and female; some out of the putrid matter of a corrupted body, but containing in it a seed fit to propagate such a Creature: and some are produced both waies, viz. both by Copulation

Copulation and by putrefaction, as Mice, Locusts, Beetles, Flies, &c.

Moreover, Bruit Creatures ingender after sundry manners; some produce live Creatures, and are therefore called *Vivipara*, as Does, Bitches, Dolphins, Vipers; some bring forth Eggs, out of which cherished with a benign gentle Heat, are hatched Chicken, Birds, Fishes: Finally, some bring forth a Worm.

What an Egg is. *Aristotle* defines an Egg, that thereout an Animal does exist, not from the whol, but from one part thereof only, the rest being turned into nourishment: and a Worm he defines by saying, that the whol grows up into an Animal. And so *Aristotle* divides an Egg into two parts; which in perfecter Creatures are manifestly different and distinct in color; but in the imperfecter sort of Creatures they are not seen distinct, but both are confounded and jumbled together into one substance.

Of which part of the Egg the Creature is made. But of what part of the Egg the Creature is made, is a controverted point. *Hippocrates*, or the Author of the Book *de Natura pueri*, saies, That it is made of the Yolk; *Aristotle* saies of the White. If we consult with experience we shal find it as *Aristotle* saies; and thus we shal find it to be: If you shal open an Egg the second, third, or fourth day after the Hen hath sat upon it, and diligently view the same; you may easily observe that the Heart is the principal Member: For it is easie to see that the rude Chick is first formed, and in it, first the Heart, which sends forth two veins; and after the generation of the yong Chick, the Membranes which are thereto subservient are evidently seen to grow together. And indeed on the eighth day, the heart is not only apparent, but together with the Veins, being of the same red color, it is manifestly seen to move and beat. On the fourth day the bodies of the Membranes being now confirmed and grown thicker, begin to be less transparent: on the seventh day by reason of their compactness, they obscure the whol Chick in a manner, or cover the same; yet the Heart is seen by its conspicuous red color, as also the Veins, and by its motion. Mean while, the Liver does not yet appear, but on the seventh day there is first seen a liquor or yellowish slimy Matter underneath the Heart, which is the beginning of the Liver growing together, and in the following daies it makes up this Body of the Liver; till which time there remains much of the Yolk, yea, when the Chickens are hatched. And in this place of the Liver for nine whol daies together, after the first formation, no blood is seen; the heart notwithstanding in the mean while being ful of blood, as also a most large Vein, drawn under the heart, the whol Bodies length. By al which it appears manifest, that the Soul sticks in the Heart as in its Root, and that the Heart is the first thing which lives, and is the Creature as it were.

But of which part of the Egg the Chick is framed, and with which part it is nourished, is not so plain: yet thus the matter seems to go. Much about the middle of the Egg longwaies, where the Yolk is joyned to the White above, the second day after the Hens sitting, there is a certain whitish beginning, more compact than the rest of the White, and as it were through a glass there is the appearance of a Chicken, the head being most conspicuous, and near the Head a red point dilating and contracting it self: The daies following, from that red point a very red Vein is drawn al along the Chickens back, every day further and further; from which afterwards Veins proceed to the skins drawn about the yolk. By which it may be conjectured, that the Chick is first made of the White; and that the aliment to be turned into blood is made of the Yolk, and carried through the Veins to the little skins stretched about the Yolk, and perfected in the Liver, which Liver hath also a similitude with the Yolk. Yet if any man shal hold, that the Yolk gives nourishment to the blood and parts nourished with blood; and the White to white parts bred of it self, and like to it self, til the Liver grow so strong as to be able to afford nourishment to al the parts, and that therefore the place of shaping is in the confines of the White and the Yolk, I shal not contend with him thereabouts.

Howbeit some Creatures there are, which engender not only often, but bring forth many yong ones at a time, as Swine, Hares, Pidgeons, &c but some bring forth few yong at a time, and seldom also. And al for the most part by mediation of the two Sexes; nor are the Sexes confounded in any kind of Creatures, so that the male should be female, or the female male; which some confidently affirm of Hares. Although it may be perhaps granted, That Hermaphrodites are more frequent in this kind of Creatures than in any others.

The difference of Creatures according to the sensitive faculty. Secondly, There is also some difference in Creatures with reference to the Sensitive Faculty: For every sense is not allowed to every Animal; howbeit the Feeling, as the first sense, is granted to al Creatures. And those that have only this sense and want al the rest, are called *Zoophita*, Plant-animals. All other Creatures have more Senses. Nor do we think fit to deny Sight to the Moles; for to what end have they Eyes if they cannot see? For

Moles.

although

although they have no need of sight, to see under the ground, yet they have it given them to avoid the light and the bright air; of which see *Scaliger* in *Exercit.* 244.

Howbeit, some Creatures excel in one sense, some in another; some in seeing, others in smelling; some in one are more excellent, some in another, both external and internal Senses.

The difference of Animals in respect of the Locomotive faculty.

Finally, there is great difference in living Creatures, with reference to their faculty Locomotive, whereby they remove from place to place: For every Creature does shift place, but some after one manner, and some after another. Some only in part, as was said of the Plant-animals, which though they are always fixed in the same place, yet they contract and dilate themselves. But others move their whol bodies, some after one manner, others after another: For some Beasts go, and that either on two feet, on four, six, or more, as Spiders; some move themselves by swimming, as Fishes, and some that live both on Land and Water; others by flying, as Birds; some by leaping, as Grashoppers; finally, some by creeping and crawling, as Worms and Serpents, who by contraction and dilatation of their bodies do move themselves from place to place.

the difference of Creatures in respect of their parts.

Moreover, in respect of their parts, there is a great variety in Animals: For as *Aristotle* hath it in 1. *de Hist. Animal. cap.* 2. *Parts of Animals are the same and divers, either in form, or sort, or exuperance, or analogie, or scituation.* And in the first place the parts by which they take their nourishment, and whereinto they bestow the same, are common to al Creatures. For the necessity of food is common to them with Plants: which Plants indeed have from the Earth, and therefore sticking in the Earth they have nourishment enough. But Animals (seeing they are more perfect than Plants) they were to have more exquisite diet than such as the Earth affords. And therefore they had not only tast given them to try their meats, but also members wherewith to receive the same, and turn it into juyce fit to nourish the body, viz. The Mouth and Stomach.

Now this Aliment received is in several Animals severally changed into Nutriment properly so called, or an humor which is the immediate aliment of the body, which when either by Nature it self (the heat in process of time devouring the same) or by violence (as in sicknesses and other cases) it comes to be consumed, the life is extinguished. Now this Humor, the next aliment of the body, is in some blood, in others a fatty and bloody moisture, like Sanies or Blood-water running from hurts of the body; as also the part wherein this aliment is contained is in some a Vein, in others a Fibre. Hence Animals are divided into such as have blood, & such as are bloodless. In the more perfect sort of animals, intended for nobler actions, and therefore needing more heat, this Humor is red and is called Blood. Yet there is in some bloodless Animals a certain red humor which is not blood, but an excrement, as in the *Purpura*. But other Animals whose bodies are more imperfect, do also need a less perfect nourishment; if moist, an white; if dry, a more obscure humor: which humors having no proper names, they are termed *Ichores*, and are blood as it were newly begun to be made and imperfect. As also in Creatures that have blood, when the blood is not wel elaborated, it puts on the nature of an Ichor as it were, as we see in Cachectical persons.

the Polypus.

the Elephant.

Also al Living Creatures have an Head, except the *Polypus*, who instead of an Head carries as it were a Hive. Limbs are wanting in some Insects; in others the fore feet are instead of fingers. The Elephant instead of hands hath his Trunk let down from his Mouth. Fishes have no necks. Most Creatures have Tails, and they are of several fashions, which Man hath not. Instead of Teeth Birds have Bils of a boney nature, wherwith they do break their meat; instead of Nostrils they have only two holes; as also two passages instead of Ears. Moles have their Eyes obscurely buried, yet are they not without Eyes. Instead of a Tongue many Creatures have a fleshy substance in their Mouths; and many with an external sharp cool spungy and hollow do both tast and draw their meat to them. All Creatures that have Blood have Skin. There is in all Creatures having blood and heads properly so called a Brain, which on the fore side is divided into two parts. The Seeing, Hearing, and Tasting Nerves, with the other parts which make up the whol Organ of Sense, are found in al perfect Animals. And the Heart, or at least somwhat answering thereto, is in al living Creatures. There is no Lungs in Fishes; instead of members of generation, Fishes and Serpents have certain holes ordained for their seed. Most of the Guts and Bowels are to be seen in perfect living Creatures; but in the imperfect they do not exactly agree with those of a Mans body, and for the most part they differ in Fishes and Serpents. Fishes instead of bones have a spine. Insects have a condition proper to themselves; for they have a cloven flesh obliquely directed, and somthing of a middle nature betwixt nerves and flesh, which is to them in-

ſtead of Bones and Spines. Proper Spirits are given to every living Creature, which the Soul doth immediately uſe to exerciſe ſenſitive actions.

Difference of Living Creatures from the place where they live.

Moreover there are other Differences of Animals from the places wherein they live, and their Actions. For firſt, ſome inhabit only one Element and live thereof; in the Air the *Manucodiata*; in the Water the *Apua*; in the Earth the Toad. But whether there are any Creatures that live in the Fire, Authors are at variance. Some hold that the Salamanders and Pyrauſtæ live in the Fire, as *Ariſtotle*, *Pliny*, *Ælian*, *Auſtin*. As to Salamanders they are ſo far from delighting in Fire, that they are found no where but in places both cold and moiſt, and they put out moſt hot burning coals, either by their coldneſs or clammineſs of ſubſtance, before they can be burnt. That the Pyrauſtæ live in the Fire *Scaliger* eagerly defends, *Exercit.* 9. 23. *and* 194. *ſect.* 4. But others hold there is no Animal which is not burnt and kil'd in the Fire; and that the Pyrauſtæ indeed are bred and foſtered in little holes about Furnaces, but never bide in the Fire, whereinto being caſt they are burnt: which is probable. Some Living Creatures live in two Elements, and find their meat in both, as Bats or Flitter-mice, which catch Gnats in the Air, and plunder the flitch of Bacon on Earth.

Whether any Creatures live in the Fire

All theſe may again be included under three kinds, Birds, Fiſhes, and Land Beaſts. The *Manucodiata* (a Bird) lives only in the Air: In the Ocean of *Braſile* there are Sea-Geeſe which live only in the Water, and never fly out, of a black Colour. In *Mare del Zur*, towards *China*, there are footleſs Birds, which never forſake the Water. The Oſtrich lives only on Land. The Hern lives on Water and Land. The Bat lives in the Air and Earth; The Swan lives, but feeds not in all three Elements.

Fiſhes that live in the Water and Land are the *Polypus* and Crabs. Thoſe that are in two are alſo in three; for they are in the Air, Water and Earth, that are in the Earth and Water; for they cannot be on the Earth, but they muſt be alſo in the Air.

Of Land Creatures which *Ariſtotle* terms *Pezа* (which word cannot eaſily be rendred in Latine) ſome live on the Land and Water, and ſeek their Food in both Elements, as Otters; ſome which are very greedy after Fiſh cannot endure to touch the Water, as Cats: ſome live only on the Earth.

Living Creatures are after another manner thus divided. By reaſon of their Food, ſome are Land Creatures, and others of the Water. Thoſe that live in the Water, do either take in the Water, or they do not. Thoſe Fiſhes take in the Water that are fenced with Gils. Thoſe which take not in the Water do draw in the Air, or they do not draw it in. Thoſe that draw in the Air and have Feet, are the Otters, Crocodiles, and ſuch like; of thoſe that have not Feet and draw in Air, is the Water-ſnake; ſuch as of this kind have Wings, are the Cormorant, Sea-gul, &c. Thoſe that draw not in the Air are the Utticа, and all Shel-fiſh. But of Land Creatures, all that have Blood and Lungs draw in Air; but Waſps, Bees, and all Inſects do not.

Again, of Land Creatures ſome fly as Birds, Bees; ſome go only on the Ground, either with Feet or ſome other way.

Such as paſs upon the Ground, are either Goers, or Creepers, or ſuch as draw their Bodies. Goers uſe Feet, amongſt which Leapers are reckoned: But the Creepers by twiſting their long Bodies, and bearing on two ſides, as four-footed Beaſts on two Legs of a ſide, do ſo move themſelves. Such as draw themſelves, are thoſe which put forth their former parts and draw their hinder parts after them and ſo win Ground.

The Difference of Creatures in reſpect of their actions.

As to their Differences in the actions of their Life and Manners, ſome Creatures live in Flocks and Companies, others live ſingle and ſolitary, and ſome live both ſolitary and in Companies. Birds that live in Companies are Pigeons, Cranes: the ſolitary are all Birds that have crooked Talons, none of which live in Companies. Among Fiſhes the Runners, the Tuny-fiſh, Whitings, Makerels. Now Creatures live ſolitary being neceſſitated thereto for getting their food. For though all kinds of living Creatures do fly thoſe of another kind and think they may live more ſafely with thoſe of their own kind, being allured by likeneſs: yet Beaſts that have Scarcity of food, and meet ſeldom with their Prey, as Birds with crooked Talons, cannot converſe with many of their own kind: For as ſome that meet with plenty of food, live in Flocks, as Pigeons: ſo to theſe (and to theſe alone) by reaſon of the ſcarcity of their food Nature hath given both Strength of Body and Fierceneſs of Mind; and the ſcarcity of their Foot compels them to Prey upon other Creatures.

Again whether they live in Flocks or Single, ſome do alwaies inhabit the ſame Country, ſome do go out of one into another, and return back again.

Again of thoſe that live in Companies ſome are Political, others are not, but mind only their own buſineſs. The Political are ſuch as obſerve a civil Policy, which requires that

publick

publick works be orderly performed by all, and that there be a Communion of the Profits acquired; and thus do the Bees, the Pismires, the Doves; but the Sparrows observe no such Order. For though they fly in Companies, yet each one by it self seeks its own livelihood, and labors not at all for the whol Society, which the Bees and the Pismires or Ants do.

Again, some Creatures are Flesh-eaters, others feed on Grass; some are Fish-eaters, others Worm-eaters, some All-eaters that will down with any thing, some have a meat peculiar to themselves, as the Bees, of which we spake before.

Moreover, some live in the open Air under the Canopy of Heaven, others live in little holes or Nests. And some have their Nests above, others under Ground; and of those that live under Ground, some make themselves holes, others shelter themselves in furrows made to their hands. Those that live above Ground some live in Walls and Rocks; others make themselves peculiar Houses and Nests. Again some keep themselves in their Nests all day, and at night come out to seek their food, and when it grows light they withdraw themselves into their smal Cottages: others again do what they have to do by day light, and mew themselves up when night doth come.

Again some Creatures are tame and gentle, others wild; and of the wild, some are alwaies so; but some may be and are tamed.

Living Creatures do also differ much in respect of their Voyce. For some utter a Voyce, others have no Voyce at al. Those that have a Noise or Voyce given them, have it to the End to express their Passions or their Necessities. Now these three differ, Sound, Voyce, Speech. Sound is the most common of the three: for every sound is not a Voyce, but only that souud which is made in Creatures, by help of the Lungs, Chest, Wesand, and chiefly the Head thereof, which is the immediate Instrument of the Voyce. Now some Voyces are expressed by Letters, and articulately distinct, other some cannot be expressed by Letters. The latter is simply called a Voyce, the former a Speech, which is proper to Man alone: for although brute Beasts aud irrational Creatures, can by Lowing, Squeaking, Barking, Neighing, Crowing or any other way express their Cheerfulness, Fear, Pain, Desire: yet Man alone is able to express all he feels in his mind, with a Voyce made up of Letters articulately distinct, and can communicate the same to others whom he hath been born to live with.

The Difference of Creatures in respect of Voyce. *Sound,* *Voyce,* *Speech,* *how they differ.*

Howbeit, though there are many differences of Animals, they may be reduced to certain kinds, as is apparent from what hath been said. Some are imperfect, others perfect: and the perfect are Land Creatures, Fishes, and Fowls. And if we were to speak of them all, we should pass from the Imperfect to the Perfect, til we came to Man, the Perfection of all Living Creatures.

Animals some perfect, others imperfect.

Among Living Creatures *Zoophyta* or Plant-animals hold the first place, because they are of a middle nature betwixt Plants and Animals, for in the shape and figure of their Body they come near to Plants, but in their sense of feeling, and a certain motion, they agree with Animals. For they have the sense of feeling, and being touched do forcibly contract themselves. And though they cannot pass from place to place: yet are they endowed with a power of contracting and dilating themselves.

Plant-Animals.

Of these some stick alwaies in the Earth like Plants, as a Tree which grows in the Country of *Pudifeta*, and seems to discern when things approach thereto. For when a Man, or other Creature draws neer, it shrinks in its Boughs; and when they go away, it spreads them forth again; and therefore the Inhabitants cal it the Bashful Tree. And *Apollodorus* the Scholar of *Democritus* writes of an Herb of like nature, which he therefore cals *Æschinomene*; because if you put your hand to it, it would avoid the same by shrinking in its Leaves, as *Scaliger Exercit.* 181. *sect.* 28. does write.

The bashful Tree. *The sensitive Herb.*

Also some cleave perpetually to the Stones or Sands; as the *Pulmo Marinus*, the Sea-Nettle, the Spunges, the *Holothuria* or prickly Fish. And some stick so long to the roots and fibres of Trees, til they attain their just growth, as the *Mytuli* or *Limpins*, which are said to grow on the Stalks of Sea-weed, and to stick exceeding fast to them at first; and having attained their ful growth and just bigness they fall from their branches: but they are not generated as other Shel-fish are of themselves.

Mytuli or *Limpins.*

Next after these, and the most imperfect, are Creeping things which grow upon live Animals, either without, as Crab-lice, Lice, Fleas, Ticks which trouble Dogs; but they say that they are not bred upon them, but they catch them as they hunt in the Woods; of which see *Scaliger, Exercit.* 195. *sect.* 7. or within, and not only in their Guts, but in other parts also, for Physitians have observed that there is scarce a part in the whol Body wherin Worms do not breed.

A Tick.

Hereto belong those Insects and smal Animals which are bred out of the Carkasses of other Creatures and out of Plants; as Wormes, Wasps, Gurgulions, Flies, Hornets, Cods-Worms, Wood-lice, Moths, Glow-Worms, Wig-lice, Horl-Flies, Grass-Worms. of kin to which are Spiders, *Phalangia*, *Tarantulæ*, Scorpions, and such like.

Bees and Silkworms Now among these kind of Creatures the most noble is the Bee and the Silk-worm; the former making most sweet and useful Honey; the latter spinning Silk wherewith the great ones pride themselves.

Then follow those kind of Locusts which *John* the Baptist fed upon: Nor is there any need that we should interpret the word *Acrides* so as to signifie the tops of Trees, or any Shrub, or river Crabs; seeing we are informed likewise by ancient Authors that some Nations did feed upon Locusts, as *Strabo in Lib. 16. in Descript. Arabiæ*; who also describes the manner how they caught them: and *Pliny in Lib. 11. Cap. 29.* who saies the Persians delight in them: and in *Lib. 6. Cap. 30.* that some People of *Æthiopia* have no other Meat but Locusts, which he saies they salt and dry in the Smoak to that end: and among late writers *Clenardus in his Epistles* writes, that at *Fez* and *Morocco* whol Cartloads of Locusts are dayly set to sale.

Next to these come sundry sorts of Serpents, Frogs, Toads, Salamanders, Locusts: To which are next in name and shape certain Sea-Insects, Flies, *Scolopendra*, Caterpillars, Sea-Stars, and such like.

Shel-Fish After them march the Shel-fish of two kinds, for some have their shels open but twined strangely about, such as the Purple, and the Periwinkle, and an innumerable sort of Shel-fish, whose shels are shaped like Turbants or Steeples; others shut their shels like two folding doors, that they cannot be opened without great force, such are Oysters and others of that kind, as Muscles, Cockles &c. of kin to which are Crabs, Lobstars, Cray-fish, the Sea-Locust and such like.

Purple. *Oysters.* *Lobstars.*

Fish. Next come the other kinds of Fishes smooth and without scales; then the scaly, the Prickly, the Sea, the River, the Lake-fish. Of Fishes (besides others) read *Scaliger, Exercit.* 218. and *Exercitat.* 223. 226.

Creatures which live in the Water and on the Land. After these come your *Amphibia*, Creatures which live partly on Land and partly on the Water, as the Tortoise, the water Salamander, the *Scincus*, the Crocodile, the *Cordylus*, The *Hippopotamus* or River-Horse, the Castor or Bever, the River-Crab, the Water-Mouse and Rat. Amongst which there is none that is partly made like a Fish and partly like a four-footed beast save the Bever.

Birds. After Fishes Birds must be explained. Now every Animal that flies is not a Bird, but only that which hath blood in it, and is furnished with a Bil and Feathers. Hence Flies, Beetles, Bees, Hornets, and such like are no Birds; as neither the Bat or Flitter-Mouse, which is of a middle nature betwixt Birds and Mice, and may be termed the flying Mouse.

The Swallow. Now there are sundry differences of Birds, which *Scaliger* hath collected in *Exercit.* 227. In the first place come Swallows, which fly most swiftly of all others; of which also there is some difference. These beeing commonly not fit to be eaten, neither can they themselves in the winter find their own meat, *viz.* Flies and other Creatures that glide about in the Air: after the end of Summer when flies are gone, they fly from these parts of the world, *Germany*, *France*, *England &c.* unto the shores of the Baltick Sea, and under huge high Rocks that hang over the Sea, they hang mutually embracing one another until the Spring return, and then when the Bird-Winds blow they return each to its own Country.

After the Swallows come the Sparrows, the Mag-pies, Chaffinch, Titmouse, and the singing Birds, as the Nightingale, the Lark, Goldfinch, the Liner, the Thrush, the Gnat-snapper, the Red-breast, the Bulfinch; also the prating Birds as Parrots, Black-Birds, Mag-pies, Starlings, Jack-daws, Jays or Gays.

After these come Pigeons, both tame and wild, as the Wood-Pigeon, the Stock-Dove, the Turtle-Dove and others.

And then the kinds of Cocks and Hens, and Birds of kin to them, as the Pheasant, the Partridg, the Woodcock, the Quail, the Ostrich, the Peacock.

Then follow Water-fowl, both the flat-footed, as the Swan, and several sorts of Geese and Ducks, The Bittern, the Water-Crow, the Cormorant, the Sea-mew, with the flat foot; and the cloven-footed, as the Hern, the Kings-fisher, and the rest.

Then come the ravenous Birds, the Choughs, the Daws, the Crows, the kinds of Vultures and Hawks, the Kite, the Buzzard, the Owl; and finally the Eagle, the Queen of Birds. Concerning Birds see *Scaliger* in his 227. *Exercitat.* and those that follow.

The Ægle.

The

the Bat.

The Bat or Flitter-mouse is of a middle nature betwixt birds and beasts, being a winged Mouse: which is of a wonderful greatness in some places: For *Scaliger* writes in *Exercit.* 236. *Sect.* 3. That in *Catigan* an Island of *Mare del Zur* there are Bats as big as Eagles, which the Natives eat, and they tast like Hens. And that in Caves of *Mount Atlas* there are Bats as big as our Pidgeons.

The Basilisk or Cockatrice.

And here we must not omit to speak of the Basilisk or Cockatrice. Now that there is such a Serpent called a Basilisk, is apparent from the holy Scriptures, *Proverbs* 23. ver. 32. *Esay* 11. ver. 8. and 14. verse 29. and 15. verse 5. *Jerem.* 8. verse 7. As also from *Pliny*, *Lib.* 8. *cap.* 7. and *Lib.* 29. *cap.* 4. Solinus *chap.* 30. Lucan *Book* 9. Dioscorides *Lib.* 6. *cap. ult.* Galen *de Theriaca ad Pisonem.* Aetius *Tetrab.* 4. *Serm.* 1. *cap.* 33. although Authors do not accord in their Descriptions thereof.

Whether there be such a creature as a Basilisk or Cockatrice.

But whether there be such a Basilisk as is hatched of the Egg of an old Cock is doubtful: Many count it for a fable: But it is commonly reported that there was once such an one at *Vienna* in *Austria*, and that the Picture thereof is extant on the wall of a certain house; as also at *Basil* and *Zwiccavia*, as *George Agricola* relates in his Book *de Animalib. subterraneis.* But there is a remarkable story which *Joh. Pincier* in *Lib.* 5. *Ænigmat. Ænigm.* 23. relates from the report of Dr. *Mosanus* chief Physitian at *Cassels*: which because few (peradventure) have read that Book, I shal here transcribe word for word.

A memorable story of a Basilisk or cockatrice.

At *Warsovia* in *Poland* it fel out in the Year, 1587. That the Son of a certain Sword-Cutler, and the Daughter of a neighboring Citizen, being both of them five years old apiece, with others their equals in years, not enduring to be out of action, after the manner of children they would needs pass the time in sports, and seek hiding holes where their play-fellows should not find them out. There was not far from the place where they played, a Cellar left detolate by reason the House had been burnt which stood over it thirty years before; into which by help of the half-rotten stairs one might make a shift to creep down. Into the said Cellar the two foresaid children going down, they fel down on the lower stairs and died. When Supper-time was at hand, the two Mothers each enquiring for her child could hear no tidings thereof: And therefore the Wife of the Sword-Cutler sent her Maid out, who having long sought them, at last spied them upon the stairs of the Cellar as aforesaid, and presently she cried out, See where they lie. But neither of the children stirring at al, she began to suspect they were fallen asleep, and with a loud voyce called by name, sometimes the Boy, and sometimes the Girl; to see if by this means she might waken them. But when she saw (though she cried til she were hoarse) it was to no purpose, she also went down into the Cellar, thinking to awaken them by jogging and pulling: But see what follows, presently also she fals down by the children and dies. Her Mistris saw the Maid when she went down into the Cellar, and perceiving that she staid over long, al amazed she ran unto the Cellar, and sees the Maid lie on the ground with the children: Therefore she also fals to cal aloud sometimes upon the Maid, then upon the children. And when she had done thus also in vain, and none of the three did either answer or stir, she concluded they were dead. Presently a rumor flies about the Town, and the Citizens come running, but know not what to do til the Magistrates and Council of the City being made acquainted therewith, did command that their bodies should be drawn out with long hooks, such as they use to pul down houses in the time of fires. They being drawn out were found swollen like Drums, their lips and tongues were swollen, their color was brown, their eyes stuck out of their eye-holes as big as half Eggs. There came to behold this sad Spectacle the Palatine N. and an ancient man the Kings chief Physitian, named *Benedictus*. He conjectured that some most venemous Serpent did lurk in that desolate Cellar, by whose deadly breath the air inclosed therein was infected, and that the weak nature of man could not bear the same; and that therefore most like it was that the children and maiden were thereby killed. Also that it might be that a Basilisk or Cockatrice might there lie hid, which Naturalists say is bred of a Cocks Egg hatched by a Toad, whose venom is so powerful that whoever looks upon his eyes dies forthwith. Being demanded how the certainty might be known, he made answer, That somebody must be sent into the Cellar covered round with looking Glasses, the right sides of the Glasses being outwards: For the Basilisk if he saw but his own picture or image would presently die. There were at the same time two Malefactors which three daies after were to be executed, the one being a Polander, the other a Silesian called *Johannes Faurerus*. To them it was proffered, That he that would go down into the Cellar and hunt out the Serpent should escape his allotted punishment. *John* presently accepted the condition: And therefore he was covered al his body over with Leather, and Glasses were tied before his eyes, which he could wel see through; in one hand he had an iron Rake, in the other a lighted

ted Link; finally, to al parts of his body before and behind Looking-glasses were fastened. Thus furnished he entred into the Cellar, more than two thousand people looking on. After he had for above an hour searched al the holes and corners of the Cellar, and could find no Serpent, he called upon them to throw him down another link into the Cellar: for there was another Cellar close by, but the way was so stopt up with rubbish that he could not get in; but he would now see to clear the way, and search there also. And as he was doing that, he chanced to turn his eyes to the left side, and unawares espied the long lookt for Beast in the shape of an Hen, lying dead in a certain hole of the wall: which when he had declared by a shout to them that were without, the Kings Doctor bad him with his Rake to bring it out into the light, which he presently did before al the people. The Doctor presently judged that it was a Basilisk or Cockatrice. It was as big as an ordinary Hen, its head was like that of a Turky-cock, his Comb resembling a Crown was sprinkled partly with yellow, and partly with blue spots, and his Chotters hanging under his Throat were of the same color. His Back was starred with many eminent spots resembling Toads eyes, the colors of virulent Beasts being every where sprinkled between, but chiefly yellow: The same colors also were on the outside of his Wings: Under his Wings he was al yellow, as also under his belly, where nevertheless blue and green and other wonderful colors were intermingled. He had long Legs like the Legs of a Cock, and yellow as a Quince-Apple; before and behind these two Legs there grew out other two Legs like the Legs of a Toad in shortness and shape. His Tail bowed and turned upwards, and was ful of such spots on the top as we said were on his back; lower it was yellow, and in the lowest part like a Toad in color. More may be seen concerning the Basilisk, in the foresaid Book of *Pincierus*, and the place fore-alleadged.

Lastly, There are four-footed Beasts, which come neerest to a Man both in the parts of their bodies, and the faculties of their souls. And among these are such as chew the Cud, that is to say, the meat which they have eaten, and is slipt into one Cavity of their stomach, they fetch it up again through their throat and chew it over again, and so transmit it into the other cavity of their stomach, better ground and prepared for further digestion: For what Nature hath denied them in the want of upper Teeth, that she makes amends for by this double chewing.

Moreover, all these Creatures have coverings given them instead of cloaths; for some have hairs, some more, some fewer; others have bristles, others wooll, and some furr. Again, some have solid, others cloven hoofs.

The lowest and most imperfect kind of these Creatures are Moles, Mice, Marmots, which *Scaliger* describes *Exercit.* 203. The more perfect are the sorts of Weezels, Hedg-hogs, Cats, Dogs (of which see *Lipsius* in his Centuries of Epistles, *Cent.* 1. *ad Belgas Epist.* 44.) Wolves, Sheep, Goats, Rams, Hares, Foxes, Asses, Hogs, Oxen, Apes, Harts, Bears, Elephants (of which see *Scaliger*, *Exercit*, 204. And *Lipsius* in *Epist. miscell. Ep.* 50.) Horses, Elks, Cammels, Leopards, Rhinocerots, Unicorns, and others; finally, the King as it were of al bruit Beasts, the Lyon.

whether there be such a beast as the Unicorn?

Only I must speak somwhat of the Unicorn, of which sundry men are of several minds. *Ambrose Parey* in the 20. *B.* of his *Chyrurgery*, *cap.* 39. where he disputes largely of this matter, after he hath brought the Narrations of some Authors touching this Beast, and observes that they agree not one with another, he concludes at last, That the word *Unicorn* is not the name of a real Creature in the world existing, but only a Fiction fained at the pleasure of Painters and Writers of Natural History, for the delight of the Readers and beholders.

But in very deed this is an absurd Opinion of his; it is also a rash thing to deny that which so many learned men affirm; and also the holy Scripture it self, *Job* 39. verse 9. *Esay*, 34. verse 7. *Deuter.* chap. 33. ver. 17. *Psalm* 22. ver. 22. and *Psalm* 29. ver. 6. *Numb.* 23. ver. 24.

there are five kinds of unicorns.

This rather is apparent from those manifold differing Narrations and Descriptions, That there is not only one Creature that bears a single Horn, but divers: For in the places cited, the Unicorn is made to be a Beast swift of foot, fit to be hunted; which is not true of the Rhinoceror, which is a thick beast with short Legs. Moreover, the Horn of a Rhinocerote is much smaller in compass than that which goes about for the Unicorns Horn. Also *Cæsar*, *Lib.* 6. *de Bello Gallico*, makes mention of an Ox in the Hercynian Forrest, out of the middle of whose forehead betwixt his Ears there grows one long Horn. And indeed there are Five kinds of Beasts that are thus single-horned. The Ox with one Horn in the Hercynian Forrest mentioned by *Cæsar*: And *Pliny* writes that such are found in the *Indies*

1. *the one horned Ox*

Lib. 8. *cap.* 21. Secondly, the same *Pliny* in the same place describes the Unicorn. *Ælian* *Lib.* 16. *de animalib. cap.* 20. in the third place describes a Rhinocerote that hath one black horn in his forehead as thick as the smal of a Mans Arm, of rare vertue against poyson. Fourthly, There is the Indian Ass, who also carries one horn in his forehead, of whom *Aristotle* speaks in 2. *de Hist. anim. cap.* 8. and the 3. *de part. Animal. cap.* 2. *Ælian* in *Lib.* 4. *de animal. cap.* 5. Pliny *Lib.* 11. *cap.* 37. *&* 41. Fiftly, The same *Aristotle* in the same place, and *Pliny* makes mention of a Beast with one Horn called *Oryx*. So that there is no doubt but there are Creatures that have but one Horn: only the Question is, Which of these Creatures Horns they are that are commonly given out for Unicorns Horns? For the variety of them shews, that they are not al of one Beast: and therefore it cannot be known but by the effect to be good against poyson. *Ælian* attributes that vertue to the Horn of the Indian Ass, rather than of the Monocerote, to be good against many Diseases and Poysons.

2. *The Monocerote.* 3. *The Rhinocerote.* 4. *the Indian Ass.* 5. *Oryx*

But touching al Animals or living Creatures, to reckon them up in this Compendium is impossible; and here again Nature is so vast of extent, that no mans wit sufficeth to take a muster thereof. And the Nature of this work makes us set Titles for Dishes before our Guests, which *Scaliger* taxes *Pliny* for in *Exercitat.* 107. Let the Student of Natural Philosophy consult hereof with *Aristotle* in his Book *de Historia part. & generatione Animalium*; Conradus Gesnerus *de Animalibus*; Edvardus Wottonus *de differentiis Animalium*; Rondeletius *de Piscibus*. And those that have written of some sorts, as *Andreas Libavius* in his Book *de Agno vegetabili Scithiæ*, of the Lamb that grows in *Scythia*; his two Books of Silkworms; his two Books of *Batrachiorum*, of Frogs. *Baldus Angelus Abbatius*, *de Viperæ Natura & facultatibus*: and many other Authors who have writ of Animals.

THE EIGHTH BOOK. *Of MAN.*

Chap. 1. *Of the Rational Soul.*

IT remains now that we should treat of MAN, who being the Rule and Measure of al Living Creatures, and being compared with the rest, may be said to comprehend them all, because he is furnished with al their faculties and endowments; with the consideration therefore of *Man* we shal conclude our Treatise of Natural Philosophy.

Now a Man (as other living Creatures) consists of a Body and a Soul. We shal speak of his Soul in the first place. And seeing every Soul may be considered under a twofold notion; first as a Principle and one part of a Compound, or as the Form of the Body; Secondly as the Efficient cause of al operations: We wil treat thereof also under both respects; and in the first place we wil consider how the Rational Soul stands in reference to the Body of Man: and afterwards what operations it doth work.

the Essential parts of Man.

No

Whether the Rational Soul be the informing Form of a Man.

No found Philosopher denies the Rational Soul to be the form of a man. But seeing there is a twofold Form, one which is called the informing Form, which is the Principle and one half of the Compound, and gives the thing its specifical being, and as a difference distinguishes it from al other things: another which is called the assisting Form, which does not give the specifical being to a thing, but is added to a thing already constituted in its specifical being, for the performance of some nobler operations, which of it self it cannot perform; (such a form as the Marriner is to the Ship, who gives not the Essence to the Ship, but is adjoyned thereto after it is perfect in its Essence, to cause it to sail, which it could not do of it self:) The Question is, Whether the Rational soul be the informing form of a Man, and the half of his Essence? or only an assistant form, which is added to a man after he is perfect, and hath his specifick form to cause in him some more noble operation, viz. Understanding.

Avenrois was of Opinion that the Cogitative Faculty (by him so called and distinguished from the Fancy) was the form of a Man, and by vertue thereof a Man became a particular sort of Living Creature; but that the Rational Soul was only an assistant form. But most of the Latines hold the Rational Soul to be the true form of a Man, and one of his constituting parts; which Opinion we retain as the more true: For if the Rational Soul were not the informing form of a Man, he could not rightly be called Rational; even as a Ship, though the Sailer therein do reason, cannot be called Intelligent or Rational, which were absurd. Or thus, which is the same in effect, that whereby any thing does primarily operate, is the form of the thing to which the operation is attributed. But to Man as Man Understanding is attributed: Therefore the Intelligent Soul is the form of Mans Body. Nor does that answer satisfie, when they say, That the Understanding is joyned to a Man by the Phantasms or Images of the Internal Senses: For the Phantasms are to the Understanding as colors to the Eye. As therefore neither the Color, nor the Subject of colors do see; so neither the Phantasms, nor the subject of the Phantasms do understand; but rather are themselves understood. Thus therefore we conclude: That whereby one thing differs specifically from another is the form thereof. But by the Rational Soul a Man differs from al other living Creatures; *that* therefore is the form of a Man. *Aristotle* also seems to have been of the same mind, as appears out of the 2. *de Anima, cap.* 1. *t.* 7. 8. *cap.* 2. *t.* 24. 25. 26. *cap.* 4. *t.* 36. 37. as *Zabarella* does shew at large in his chap. 7. *de Mente Humana.*

Whether there be one Rational Soul in all Men.

From the Explication of this Question another Question may easily be answered, viz. *Whether the Rational Soul be one in number in all men? or there be in every one a peculiar Soul?* Some that hold the Rational Soul to be an assistant form, do hold that it is not multiplied according to the number of Persons, but that in al Man-kind there is one only, which is the cause of Understanding in al Men. But in very deed this Opinion is many waies contrary to the truth: For every informing Form, such as we have already shewed the Rational Soul to be, is multiplied according to the multiplication of particular persons. And if there were only one Soul in al Men, al should be but one; for they should have but one Form. Moreover, the operations, or understandings, or second acts, are multiplied in Men according to the multitude of Individuals; and my Understanding is one, and thine another, a third Mans another. Therefore the Soul the first act is manifold: For the diversity of operations depends upon the diversity of Forms. Finally, in one and the same Understanding there would be contrary operations: for one man is of one Opinion, another of another about the same thing.

Whether the Rational soul be immortal?

And since we have averred the Rational Soul to be the Form of Man, here arises a Question, whether or no it be immortal? or, *Whether it can without perishing be separated from the Body?* As for us, according to the Tenets of our Religion we hold, that our Soul is immortal; and the Immortality of the Soul is counted one of the Hinges upon which Christian Religion turns. But whether or no it may be proved by Philosophical Reasons, and what *Aristotles* Opinion was concerning the same, hath been carefully enquired into by many.

A thing two waies immortal.

In the first place, this we must hold, as *Scaliger* hath it, *Exercit.* 61. *Sect.* 5. and *Exercit.* 307. *Sect.* 20. that only God is truly immortal, and incorruptible. And therefore a thing may be said to be immortal two waies; either because it cannot perish at al, because it is most simple, and hath its Essence of it self, and depends upon none; and such is only God, and in respect of him al other things may be called corruptible: For although Angels and the Rational Soul, which are said to be immortal after the second way, are never actually corrupted, have no contrary, and are separate from their subject; yet seeing they are not without Cause, and they have not the Cause of their Essence from themselves, but are by another,

and

and by another may naturally come to be no more. For every dependent may be changed by that on which it depends, if it be a voluntary principle, and at the pleasure of the first principle it may be deposed from its Essence wherein it was thereby instated. Now some things are not corrupted, because the Creator wil not have them so to be, who hath created nothing in them contrary, whereby they might be corrupted, nor hath plunged them so in matter, as they can neither be, nor operate without it. And that the Soul of man is of this kind, and that it may be separated from the body without corruption, *Marsilius Ficinus* endeavors to prove by many Arguments, *de Immortal. Anim. Lib.* 5. *Tolet. Lib.* 3. *de Anima, cap.* 5. *quest.* 16. Franciscus Piccolhomineus *Lib.* 2. *de Humana Mente, Colleg. Conimbricens. in tract. de anima separata, disp.* 1. *Artic.* 3. and others.

We shal briefly thus determine the matter: Every thing is known by its operations, and every form discovers it self what it is by its operations. And therefore since the actions of Man are so noble that they cannot proceed from a mortal substance wholly plunged in the matter; it is plainly to be hence gathered, that the rational Soul from which they proceed is immortal and separable from the matter: for the Understanding abstracts and severs things from the matter, and knows without conditions of matter, without quantity, without figure; it understands things free from matter; it is not offended with the multitude and vehemency of the Objects as the Sense is; it can conceive things infinite; and although it knows very many things, it may alwaies know yet more, and can encrease a number though never so great; and not only knows a thing, but also knows it self, and understands that it understands what it doth understand; it can wil and refuse, hath an unsatiable appetite of eternity, knowledg, happiness; which because it cannot be satisfied in this life, it is credible that it shal enjoy another condition wherein those appetites shal be satisfied; also it performs operations without corporeal Instruments. See *Franisc. Piccolhomineus de humana Mente, cap.* 6. *Aristotle* also seems to have been of this opinion, as appears in his Physicks, *Lib.* 7. *cap.* 3. *text* 20 1. *de Anima cap.* 3. *text* 49. *cap.* 4. *text* 64, 65, 66. 2. *de Anima, cap.* 2. *text* 21. 3. *de Anima, cap.* 4. *t.* 3. 4. 7. 12. *cap.* 5. *text* 19. 20. 7. *de part. animal. cap.* 1. 12. *Metaphys. t.* 17. of which see *Francisc. Piccolhom. Lib.* 2. *de humana mente, cap.* 2. *et sequent.*

Thus far we have shewed how the rational Soul is referred to the body of man: we are now to explain the nature thereof, as it is a principle of operation. Now *Aristotle* expresses the nature thereof, in this respect, in *Lib.* 3. *de Anima*, when he saith; that the rational soul is unmixed. Now the Soul must be unmixed two manner of waies: first, in respect of the Objects, so that it must not have their nature in its essence, but only a power to receive them. For because it ought to know the Objects, and it knows them by receiving them, it must needs of it self be free, unaffected and unmixed, since nothing receives that which it hath already; and that which is within hinders the ingress of another. And this immixture (that I may so speak) is common to the rational Soul with the Senses, which also have not their Objects actually in themselves, but only a power to receive them: save that the senses are respectively unaffected and unmixed, *viz.* with some sort of being, as the sight (for example sake) within colour, seeing they are not conversant about every kind of being: but the rational Soul is quite free from the natures of al other things, as being directed to al things, and its office being to understand all things. *The rational soul is unmixed.*

Again, the rational Soul is after a peculiar manner free from Organs, nor mixed therewith; that is to say, when it operates by understanding or willing, it makes no use of the body, but performs those functions without it. For, inasmuch as to perform the actions which are done in and by the body there is required a certain temper of the qualities (seeing every body any waies tempered and disposed doth not receive every thing) and consequently also a certain Organ; since the several parts of the body have several temperaments; and the rational Soul is not tied to any temper of the first Qualities, nor any waies affected by the qualities, nor is there any proper Organ thereof in the body: we must doubtless therefore beleeve that it depends not upon the body, in respect of its operations, nor that it is after any such manner mixed therewith.

From this other immixture we may gather, what kind of operations those of the soul are. For since in its acting it is no way mixed with the body, and the actions of the body have nothing to do with the action of the mind: it is manifest that the Understanding and the Wil are inorganical faculties, and act of themselves; so that to understand and to wil, are actions proper to the mind; nor doth the mind understand by the body, or any Organ of the body, as by a medium wherewith it acts. The Soul indeed hath need of a Phantasm; *The Operations of the rational soul are inorganical.*

since the Soul while it is in the Body never understands without a Phantasm, *Lib. 3. de Anima, cap. 7.* but it useth the same not as an Organ, but as an object; because an intelligible matter must be presented to the mind by the Senses. And therefore if any have affirmed that the actions of the mind are organical, and that the rational Soul doth use the help of the Brain, Spirits, and Senses, as corporeal Organs, that is not to be admitted save in this sence, viz. that the soul doth not understand while it is in the body, without the foregoing operation of the Organs of the body, and before its own operation: or that in subordinate operations it uses an organ, and needs the brain, and spirit: but while it is in working of it self, or while it purely understands, and purely wils, it needs them not, nor doth it understand by organs, but this mind only is the subject of understanding, as also of the act of willing, which our barbarous Authors cal volition, by a new necessary and fitting word, as *Scaliger* saies, *Exercit. 307. sect. 3.* and *sect. 9.* and though when the Brain is hurt Reason is depraved: yet that is done for no other cause, but that the administring or the subordinate faculties, which are organical and depend upon the constitution of the Brain, are hurt.

The rational Soul hath two proper faculties.

And although the rational Soul be furnished with all those faculties which we have hitherto attributed to the vegetative and sensitive Soul: yet hath it besides two proper and peculiar faculties, whereby it excels Plants and other Animals; the Understanding, whereby we apprehend and know things; and the Wil, whereby we are carried out to such things we understand to be good. And there is a manifest difference betwixt these faculties, seeing it is one thing to know, another thing to desire the thing known; and these two are performed by a several way of working; the former by passion and reception of the species, so that the things may be carried to the mind: but the latter by following, so that the mind is carried and drawn to the object. Finally the diversity of the object severs the power of knowing from the power of willing, seeing we know things as *Entia* or Beings; but we desire them as good.

The difference of the understanding.

The Understanding is therefore actually none of all the other Beings that are: yet it can spiritually receive and know them all. And although in respect of its essence it is one and the same, as being an inorganical part of the soul, which hath no variety from the Organs: yet according to certain respects it is divided into sundry differences. And in the first place *Aristotle* cals one the active Understanding, another the passive, supposing that in our mind besides that which is apt to be made every thing, viz. by understanding, and which is as it were the matter, there is somwhat in the nature of a form which is apt to make all things, that is to say, actually intelligible.

What the active understanding is.

But what the active Understanding or the *Intellectus agens* is, is an obscure point in Philosophy. Very many hold that the active understanding is God, or some Angel who is assistant to a man. But these mens opinion seems to differ both from *Aristotle* and the Truth. For the Intent of *Aristotle* (in *Lib. de anima*) is to speak of the humane understanding, and he plainly in *Lib. 3. de anima, chap. 5.* cals the active understanding a difference in the Soul. Again, that understanding which proceeds from the *Intellectus agens* or active Intellective faculty is in our own power, nor doth it proceed immediately from God or any Intelligence or Angel. Moreover seeing God when he first made our understanding could put as much light into it as he pleased, there is no need that he should alwaies be assisting the same, like some Judg at the Assises, as *Scaliger* saies in *Exercit. 307. sect. 19.* But the active understanding is (according to the opinion of the Philosopher) a difference of our Soul not informing, which of things potentially intelligible makes things actually understood. For as to a natural affect there is required an agent of the same kind, and for artificial effects there is need of Art: so for the work of the mind, viz. Understanding, an agent is required, not separate from the Soul, but which is a part, or some difference of the soul.

And although this Agent Understanding seems to some unnecessary, who would have it banished out of natural Philosophy: yet it seems altogether necessary to hold an Agent Understanding, for this cause, seeing every thing that is done is done by somwhat and in somwhat, so that *that by*, and that *wherein*, do differ. Universals are made in the passive understanding, therefore there must be besides it another power to make Universals. For since every Patient requires some Agent, and nothing in nature brings it self from power to act; and our understanding is constituted in a possibility actually to understand, and by receiving intelligible objects doth actually suffer: cleer it is, that holding a passive understanding, we must withall hold an active, and taking away the latter we deny the former. The Agent understanding therefore is for this cause necessary, that it may do or make all things, viz. as to their intellectual being, that is, that it may transfer the object from one order to another. For seeing the Object or Phantasm is material, and so under an

opposite

opposite condition to the intellective faculty, which is abstract from all matter; it cannot be by the said faculty understood, unless it be made proportionate thereunto, viz. abstracted and immaterial: now this cannot be done save by an abstract Virtue, and an Intelligent nature.

The Office of the active understanding

From whence it is apparent, that it is the Office of the active understanding to act, that is to draw from power to act, and of things potentially intelligible to make things actually intelligible. This Office of the understanding *Aristotle* expresses by the analogy it bears to Art, Nature, Habit, Light. For it is as it were the eye and light of the mind, and it is to the Phantasms, as light to colours. For it illustrates the Phantasms, being inveloped with material conditions, which like darkness do hinder their being understood, so as they may put on the nature of things intelligible, and may be diffused to the passive understanding: even as Colours by means of Light do send forth a Picture of themselves unto the sight: yet this illustration of the Phantasms is not performed formally, so that any quality is imprinted upon them; nor objectively only, but effectively; because the Agent understanding like external light by imparting its Ray yet doth actively elevate the Phantasms, to the production of an Intelligible species; nor is the Agent Understanding requisite only in respect of the object, but it hath also another office, viz. in reference to the passive understanding, that it may produce therein the act of understanding, representing thereto an object in a species intelligible, which it performes when together with the illustrated Phantasm it produces a species of the thing to be understood, into the passive understanding.

The Subject

Whence we may collect, upon what and how the Agent understanding doth act. For it is requisite in respect of both actions, viz. that it may act upon the Phantasms, and upon the passive understanding. But it acts upon these in a different manner; for it is joyned to the Phantasms before Intellection, and indeed while they are yet in the Fancy, where illustrating them it becomes their form, whereby they are made a moving object of the passive understanding: afterwards, the adjoyned Phantasms being illuminated, it acts upon the passive understanding, by producing therein an intelligible species or representation, and by consequent the act it self of understanding: But the Agent understanding it self as it is an Agent doth not understand; since it doth not receive the intelligible speces or notions, though it produce them, nor is in aptitude to understand; but the act of understanding is in the Passive Intellect, as in its subject. This therefore is called formally the Intellect; the other only effectively, because it makes the understanding or Intellection.

The passive understanding what it is.

The Passive understanding is as it were the subject and matter, whereon the intelligible species are imprinted; and therefore 'tis called Patient and Passive, because it suffers by receiving the species, through means of the Phantasms. It is also called *Intellectus possibilis*, the possible understanding, and the mind in power; because it may be made all things, though it is actually none of them.

And here in the first place we must remember that the passive understanding is indeed in respect of the object a passive power; seeing it acts upon no other thing: but compared with the Intellection it is a power, both active, inasmuch as it works Intellection; and also passive, inasmuch as it receives the said Intellection. For an immanent action must be received in the same power by which it is produced.

Moreover we must observe how that it is to be understood that *the understanding when it understands, is made all things*, which in the most elegant words of *Scaliger*, *Exercit.* 307. *sect.* 6. thus we explain. *In the first place* (quoth he) *I deny that the Philosopher saith, that our understanding is all things essentially or formally as they use to say. But it is all things, subjectively, even as the first matter is, which is not made the Essence of an Horse under the form of an Horse: but it remains that which it was, a certain substance, of which and the form this thing is made. But the information of the understanding is after another manner: for it is not a meer possibility, as the first matter, which may be reduced to be actually this or that by the form. But it is our form substantial, separable, incorruptible, eternal; of which as a subject essentially perfect, and the species which it receives, is made the formed intellect, not another from it self; save as* Cæsar *being learned differs from himself unlearned, by reception of accidental species. It is not therefore made the understanding simply, nor is it made the species it self, but under the species.* So far *Scaliger.*

The Agent & passive Intellect do not really differ.

And so much shal suffice to have said of the first difference of the understanding: where this again is to be observed: that the Agent and passive understanding are not really and essentially distinguished, but only respectively; since two internal forms are not knit together by new accidents, and to the receiving and effecting of an immanent action (such as understanding

ſtanding is) ſuch a principle is requiſite as is eſſentially one. And therefore we muſt conclude that the Eſſence of the Agent and Paſſive Intellect is al one, and that one Underſtanding in Eſſence, inaſmuch as it makes things intelligible, or illuſtrates the Phantaſms, and repoſits them in the Paſſive, is Agent; but inaſmuch as it is the ſubject receiving the abſtract Phantaſms, it is called the Patient.

the Underſtanding in habit:

Beſides the Differences reckoned up, there are alſo other notions of the Underſtanding, as the Underſtanding in habit, and the Underſtanding in act; which indeed are not divers Underſtandings, but one that hath divers degrees, which *Ariſtotle* cals differences. For the Intellect in habit is that which hath the Phantaſm reſerved in the Phantaſie; and it is in a more perfect degree than the poſſible Intellect: for this is in aptitude to the firſt act, the other is in aptitude to the ſecond, or to the operation, and therefore is very like to him that hath ſcience, and does not contemplate. Howbeit *Zabarella* ſeems to think otherwiſe in this point, *Lib. de ſpecieb. Intellect. cap.* 8. after this manner; That our mind is firſt born rude and unfit for the knowledg of things; but afterwards by multiplied acts of Underſtanding it acquires a certain greater ability and aptitude to underſtand things, ſo that it can without any labor when it pleaſeth turn to the Fancy, and preſently underſtand a thing: and that the Underſtanding being furniſhed with this ability is called the Intellect in habit. But when the Paſſive Underſtanding does actually operate, and actually perceives the thing offered, it is called the Intellect in act.

the ſpeculative and practical underſtanding:

Finally, the Underſtanding is diſtinguiſhed into Speculative and Practical; by which terms nevertheleſs there are neither made two faculties of underſtanding, nor are the differences and degrees of the ſame Faculty intimated; but each Faculty of the Intellect is ſignified by the Theoretick or Speculative, the Underſtanding properly ſo called, and by the Practical the Will. For ſeeing the Underſtanding in reſpect of the apprehenſion of a thing, alſo in reſpect of Affirmation and Negation of that which is true or falſe, cannot be otherwiſe called than Speculative; of neceſſity that difference muſt ariſe in reſpect of a third attribute of the Practical Underſtanding, viz. Deſiring and avoiding, which belong to the Will.

the Operation of the underſtanding:

The operation of the Underſtanding to which al the Functions of its degrees do tend, is Intellection, which is not one and the ſame thing with the Intelligible Species, but really differs therefrom, and is more rightly defined by reception of Intelligible ſpecies (in which ſenſe it is by *Ariſtotle* termed a kind of Paſſion, 3. *de Anima, cap.* 4.) and paſſing judgment thereon. For the Intellect exerciſes a twofold operation about its object; the former of which is ſimple Apprehenſion and Cognition; but the other is termed Compoſition and Diviſion, and it is compound Apprehenſion and Judgment, which conſiſts in Aſſent and Diſſent. And hence Intellection is ſaid to be twofold; Simple when the Intellect knows that which is ſimple and incomplex, as they cal it: and Compound, when it knows a propoſition true or falſe.

Intellection is twofold:

The Object of Intellection which at once moves and terminates the intellect, is a Being or thing Univerſally taken, comprehending things material and immaterial. To which nevertheleſs ſome conditions muſt needs be added. And in the firſt place Univerſality: For that a Being may be perceived by the Intellect, it muſt be abſtracted from al ſingularities. Then Secondly, Intelligibility, or abſtraction from the conditions of matter. Thirdly, Verity. This Object as it is fitted and proportioned to the Mind by the Agent Intellect, is called an Intelligible Species; as that which the Senſes receive is called a Senſible Species.

Intelligible ſpecies what they are.

Now the Intelligible Species are illuminated Phantaſms, that is to ſay, freed from the conditions of matter, and by the Agent Intellect imprinted upon the Paſſive, and conſequently ſpiritual and indiviſible accidents: For a Subſtance is not received into the Senſe, as *Scaliger* would have it, *Exercit.* 303. *Sect.* 7. but only accidents. And therefore only accidents do make the Species or Image in the Intellect; amongſt which are both time and place, and the finite Unity of quantity, which being removed by the operation of the Intellect it ſelf, there remains an Univerſal ſubſtantial Species: As if you ſee a man armed and diſguiſed; firſt you apprehend the Arms the diſguiſe, and afterward having removed them you conceive the Man himſelf.

Whether or no, and how the underſtanding perceives particulars?

And ſince we have juſt now aſſerted, That ſuch things as are offered to the Intellect, and received by it, muſt be ſeparated from matter and al particular conditions, the Queſtion is; How the Intellect underſtands particular things, or whether it be capable only of univerſals? We anſwer, That the Mind of Man does alſo know particulars. For ſince al knowing Faculties being ſubordinate, are ſo joyned that the end of one action is the beginning of another,

ther, and what ever is known by the Inferior Faculty is also known by the Superior; and the Senses and Fancy know particular things, the Mind also must needs know the same. And by means of this knowledg it comes to pass that a man is able to compare a singular with an universal, and that the mind can frame singular propositions, collect universals from them, and frequently correct the judgment of the Senses about singular things, viz. As oft as they (by reason of an evil disposition of the Object) do commit any error. Now the manner of knowing singulars is also by accidents; because out of the proper singular accidents we draw out a notion or phantasm proper to the single Objects; even as out of the notions proper to a sort we draw out a notion proper to the same sort.

Understanding Direct. *Reflex.*

Intellection is commonly divided into direct and reflex. It is termed direct, when we only know somwhat, and make no further enquiry, but the Species gives a stop to the Intellect, as when the Understanding staies at the first apprehension of a Man, an Ox, an Horse, &c. but that is termed Reflex, or doubled and reciprocal as it were, whereby the Mind knows it self, viz. That it knows, and hath the power to know and Understand; or when we understand the Intellection it self, and the Understanding knows that it is an Understanding, viz. That it self is an Essence and an unmixt one, and knows that it understands, because that it is able to know it understands.

What it is to abstract

And here you must observe, what it is to abstract. Now Abstraction is the separation of one thing from another, and the apprehension and understanding of one thing without the apprehension or understanding of others. For in Abstraction al things are not known which are in a thing, but that only which is abstracted: for examples sake; To abstract the Living Creature from the Horse, is to consider only the Nature of a living Creature in general, not regarding the particular Nature of an Horse.

The will what it is.

Finally, The Will (that we may also speak briefly thereof) is the other Faculty of a Rational Soul, whereby we follow or avoid such things as are known by the Understanding; or (as *Scaliger* hath it, *Exercit.* 307. *S.* 3.) The Will is the Understanding extended to the having or doing what it knows. Others cal it the Rational Appetite. For as after the knowledg of Sense there follows a Sensitive Appetite; so after the knowledg of the Mind an Appetite follows proper thereto, which to difference it from the former, they cal it *Voluntas*, the Will; and that this Rational Appetite differs from the Sensible is hereby apparent, because they are frequently at enmity one against another.

The object of the will. *Its actions twofold.* *1. Drawn out.* *2 Commanded.*

The Object of the Will, is *Good* known by the Understanding and presented to the Wil, and the contrary Evil: Hence it follows the Good, and shuns the Evil. The Actions of this Faculty are to Will or Desire, and to Nill or Refuse. Now the Actions of the Will are twofold; *Drawn out*, and *Commanded*. The *Drawn out*, are those which the Will puts forth and performs of it self, and not by the inferior powers. The *Commanded* are those which the Will commands and enjoyns the inferior Faculties to perform. Now the Will hath command over the Locomotive Faculty, and the Sensitive Appetite: for at the word and command of the Mind and Will we move and rest. But the command which the Will ought to have over the Sensitive Appetite is much weakened by sin, and that same harmony disturbed betwixt the two Appetites; so that many times the Sensitive Appetite casts off the command of the Will and right Reason, and that saying becomes true:

Hurry'd the Coach-man is, and the Coach away, by the Horses.

But the Will hath no command over the Vegetative Faculty, and it acts meerly naturally, nor can we be nourished or grow according to our own will and pleasure.

Chap. 2. *Of the Body of Man, and its Functions.*

NOW the Soul of Man, since it is the Rule (in a manner) of al things living, as *Scaliger*, *Exercit.* 102. *Sect.* 5. hath it; it must also of necessity have the most noble Body of al; which ought now to be described, as the Rule of all the rest. But since the dignity thereof, yea, and the necessity that there is of its knowledg, hath stirred up many to seek the knowledg thereof, so many Volums are written concerning the same (wherein both its parts are accurately described, and the uses of al of them laid open) that it is an impossible thing to Epitomize the same. To name a few Authors: *Galen* hath written many Books of this subject; of the Dissection of the Muscles, Nerves, Veins, Arteries, vocal Instruments, Womb, of the Bones, of Anatomical Administrations, 9 Books; of the use of the Parts, 17 Books, and others. Very many men of this Age have diligently written of Anatomy, amending

amending and encreasing the Doctrine of *Galen.* And amongst them chiefly *Vesalius, Fallopius, Columbus, Sylvius, Piccolhomineus, Laurentius, Platerus, Bauhinus, Casserius, Fabricius, Riolanus, Spigelius,* and very many more, all whom to reckon up the Nature of this short work will not permit. We shal therefore in this place only with brevity name the Parts of the Body whereby al the actions thereof are performed; the Description whereof may be seen in the Authors aforesaid, which are in the hands of every one.

the disposition of the parts of the body wherein it consists?

Now that the parts of our Bodies may be fit to perform their actions, they must needs be rightly disposed. Now that disposition consists in three things: For since the parts of our Body are considered either as similar only, or as dissimilar and organical; in both of them Unity is required, and it is necessary that every part be one and entire. Moreover, particularly in the similar parts there is required temper; in the organical composition and conformation, necessary for the actions of the Body; which is in divers parts different, according to the diversity of the actions by them to be performed.

the Constitution of the similar parts.

the temperament of a Man, twofold.

Now what in general a Temperament is, and what are its differences, hath been already declared in Book 3. chap. 4. But as to what concerns the Temperament of a Man, in him (as also in other Creatures, of whom he is as it were the Rule and measure) is found a twofold Temperament; the one of a Body, considered simply as a mixt Body; the other of a living Body. For when a man dies, that temper which he had as a living body does withal vanish; yet in the Carkass til it rot the parts do for a while retain the composition and temper which they have from the Elements.

Each part hath a peculiar temperament.

Concerning the Temper of a mixt Body we spake before in the Book newly cited: but the Temper of a living Man, which results out of a certain harmony of al his parts, although it be hot and moist, and Life consists in Heat and Moisture; yet there is a great diversity in the Parts. The Skin is the most temperate, especially that in the Hand.

Hot parts:

Among the Hot Parts the chief is the Heart: after the Heart follows the Liver, the Spleen, the Flesh of the Muscles, the Kidneys, the Lungs, a Vein, an Artery, Fat and Suet.

Cold parts

Among Cold Parts, the first are the Bones, then the Grisles, the Ligaments, the Tendons, the Membranes, the Arteries, the Veins, the hard Nerves.

moist parts

The Moist parts are, Suet, Marrow, Brain, Spinal Marrow, Stones, Dugs, Lungs, Spleen, Kidneys, Flesh of the Muscles, Tongue, Heart, soft Nerves.

Dry parts.

The dry are, Bones, Gristles, Ligaments, Tendons, Membranes, Arteries, Veins, hard Nerves.

the inbred Heat wherein it consists.

Now this Temperament of a living Body is twofold, or consists in two things; Innate, and Influent Heat. Innate Heat is in that which is the inbred hot juyce natural: For by innate heat we understand not a bare quality, but a quality with its subject. This Innate Heat consists of the inbred Spirit and original moisture: and is nothing but the Primitive Moisture filled in al parts with the implanted spirit and heat. For these three, Heat, Spirit, and Radical Moisture, or Natural Balsam as some cal it, are so joyned together, as that they cannot be easily separated. For this is that Body *which is more Divine than the Elements so called, and is a substance bearing proportion to that of the Heavenly Bodies,* as *Aristotle* terms it in his 2. *de generat. Animal. cap.* 3. and by which the seeds of things are made fruitful, as the same *Aristotle* informs us.

the Subject of the inbred heat:

This inbred heat is principally in the Spermatick Parts, which are called the first Parts. But it is chiefly found in the Heart, which therefore *Galen* cals the Hearth or Chimney of the inbred Heat. And this innate Heat is the chief instrument of the Soul, whereby it performs and perfects al actions. At the beginning of a Mans Life, and in his yonger yeers, it is much in quantity; and as he grows older, the Radical Moisture is gradually consumed and dried up, til at last being quite spent, the Heat is also extinguished, and natural Death follows.

what the spirits in the body are?

Now this inbred Heat is cherished and fomented by the influent Heat, through means of the Spirits, which are a most thin, hot, and movable body, bred of the most sincere and subtil part of the Blood; and being joyned with the inbred Heat they are the immediate and chief Instrument of the performance of al actions, and are a cause that the faculties of the Soul exercise their operations.

they do not conveigh the faculties:

'Tis commonly taught by many, That these Spirits are the conveighers of the Faculties from the principal Parts to the rest of the Body: but this is a false Opinion. For seeing the Faculties are inseparable Properties of the Soul, and the Soul is in all the parts, it is every where furnished with its Faculties, not borrowing the same elsewhere.

the number of the Spirits:

Now touching the Number of these Spirits, several men are of several Opinions; and some

make

make one, and others more. But we have reason to hold that there are divers Spirits. For although the more subtile part of the Blood be the first matter of them all; yet they receive a diverse form in sundry parts, and are fitted for divers uses.

Now the Spirits are three, Natural, Vital, and Animal.

The Natural:

Touching the Natural many doubt. We although we admit them into the number of Spirits, yet we acknowledg no smal difference betwixt it and the other Spirits, and that the name of Spirits does not so properly belong to them as to the others, nor that they have the same Office. Now it is generated in the Liver, and is contained in the Veins, and is the thinner and more spirituous part of the blood, bred of the vaporation of the blood, and affords matter to make the Vital Spirits of.

the Vital:

All grant a Vital Spirit, which is generated in the left Ventricle of the Heart of the thinner part of the Blood, or Natural Spirit, flowing into the Heart, and first of al attenuated and elaborated in the right Ventricle; and of the Air drawn in by breathing, and by the dilatation of the Arteries. This Spirit is not only in the Heart the chief Instrument thereof, together with the inbred heat of the Heart; but also being spred abroad through the Arteries into the whol Body, it cherishes the inbred heat of al the parts, excites and encreases the same, and gives perfection as it were thereunto. And therefore some call it the influent Heat. Also this Spirit affords matter for the Animal Spirits.

the Animal:

Many indeed deny the Animal Spirit; yet we have reason to admit the same, seeing it is wrought in a peculiar Member, viz. The Brain, nor can the Vital spirit perform those uses which the Animal does, and in a part ful of Vital Spirit we see sense and motion taken away for want of Animal Spirits, as in the Apoplexy, Palsey, and stupidity.

For this Spirit is the immediate Instrument of Sense and Motion; and it is generated of the purest part of the Vital Spirit, carried by the Carotick and Cervical Arteries into the Basis of the Brain, and thence into the Brain it self, and mingled with Air drawn in by the fetching of breath.

the Constitution of the Organick parts:

Moreover, The Organick parts have also their proper Constitution, viz. A due composition and connexion of the similar parts into one form and shape, fit to exercise the action. Now there is required to the composition of Organick parts; first a just number of parts compounding; secondly, the greatness fit for the said parts; thirdly, a decent conformation, which comprehends a figure fit to perform the action, cavities and passages, and that the surface be rough or smooth, as the Nature of the part requires; fourthly, scituation and connexion with other parts.

These things whereof we have hitherto spoken being common to al parts, and necessary for al actions; we will now furthermore briefly recite how and by what parts the several actions are performed.

And seeing the Vegetative Faculty is the lowest, we wil first treat thereof. Now it contains under it, Nutrition, Augmentation, and Generation.

And as to Nutrition and Augmentation in the first place, seeing in them Aliment is joyned to the Body from elsewhere (and the Aliment is in the first place unlike of substance) it must be elaborated by divers Concoctions, and be first made fit for the Body.

A double Concoction in the body private & publick.

This Concoction is twofold; Private, which is performed in the several parts; and Publick, which is ordained for the use of the whol body, and is performed in the stomach chiefly, and in the spleen.

the first Concoction

The first Concoction therefore is performed in the stomach; and for the same cause a double Appetite is given to the stomach; a Natural, whereby it desires food for it self alone; and an Animal Appetite, whereby it desires food for the whol body.

For by Appetite and hunger a Man is pricked on and provoked to eat, and then the first preparation of the Meat is in the Mouth. For in the Mouth it is by the Teeth broken and ground; which for that cause (although they serve also to form the Speech) are given to a man commonly thirty two in number, in each Jaw sixteen; of which some are called Cutters, others Dog-teeth, others Grinders. The Cutters or foremost are four in each Jaw; the Dog-teeth two; the Grinders ten. Moreover, by the Mouths heat, and the mixture of spittle, the meat is altered. The Meat being thus broken, ground, and prepared in the Mouth, is by the Tongues motion thrust down the gaping Throat into the Stomach, which the stomach by help of the oblique fibres does imbrace and retain til by the Concoctive Faculty thereof and its proper heat it be turned into a Mass not unlike Barley Cream, which is called *Chylus*.

the making of Chyle.

The Chyle being wrought in the stomach is sent out by the lower Orifice into the Guts, and is by them stil more elaborated. Now the Guts are of two sorts, the Thick and the thin:

Distribution of the Chyle:

thin: The thin are three, *Duodenum*, *Jejunum*, *Ileon*; the thick also three, *Cœcum*, *Colon*, *Rectum*.

the Excrements of the first digestion.

And seeing no Meat can be turned wholly into Nourishment, but hath some parts in it unprofitable to nourish the Body: Nature in this, as all other Concoctions, separates what is unprofitable, and breeds here a two-fold Excrement, the one thick, the other watterish.

the Dung

The thicker Excrements are the Dung, whose expulsion is through the Belly by stool: the Guts partly by their circular and transverse fibres (with both which both their Coats are furnished) contracting themselves above the same; partly by help of the Muscles of the Belly, whereby the Belly is squeezed; and so the Excrements are forced downwards.

The thin and watry excrement.

The thin and watterish Excrement is not presently voided forth, but remains mixed with the Chyle, that it being thereby made thin may the more easily pass the narrow Veins of the Mesentery and Liver.

The second Concoction, or blood-making.

The first Concoction being finished, the Chyle is received out of the Mesaraick Veins, (whose Orifices reach into the Guts) is altered and changed a little, and is hence carried to the Roots of *Vena Porta* and to the Liver.

And that the blood may be bred more pure in the Liver, after the Blood hath received some rudiment in the Mesaraick Veins, that which is therein thick and dreggy is drawn by the Spleen through the Splenick Branch of the *Porta*, out of the Trunk of the Mesaraick Veins before it pass to the Liver; where the Spleen alters it as much as it can and the matter will bear, and thereof breeds for it self and the ignoble parts in the Belly a thick and dreggy blood. But that which is quite excrementitious, and cannot be turned into Aliment is evacuated, partly by the Hemorrhoidal Veins and *Porta's* Trunk, and partly by the Splenick Arteries.

The Chyle after it hath received some rudiments of Blood in the Mesaraick Veins, and is by help of the Spleen purged from the more dreggy parts thereof, it receives the form of perfect Blood in the Liver; and is thence distributed into al the parts of the Body to nourish the same.

Excrements of the second digestion.
1. Yellow Choler:
2 Urine

And since in every digestion Excrements are bred, there is also in Sanguification a two-fold Excrement; yellow Choler, which is collected into the Gall-bladder, and is thence voided by the Guts, exciting them by its acrimony to purge themselves: and the serous or wheyish excrement, which is drawn through the Emulgent Veins by the Kidneys, and is transmitted through the Ureters into the Bladder, and is by it voided forth and called Urine. For the Urine is nothing else but that watry moisture in the Chyle that served to make it pass more easily, and the salt which was superfluous in the meat and unfit to nourish the Body. Which appears not only by the taste, but also becaufe store of salt is drawn out of Urine, the watry moisture being separated.

The blood consists of divers parts:

The Blood which is distributed into the whol Body to nourish the same, although it is contained under one form or shape, and is al useful to nourish the Body; yet its parts are not quite alike, but some temperate, which are peculiarly called blood; others hotter and drier, which are called Cholerick Blood; others colder and moister, which are called Flegmatick Blood; others colder and drier, which are called Melancholy Blood; but vulgarly these parts are called, Choler, Flegm, and Melancholy.

And of these parts none is Excrementitious, but al are useful to nourish the Body; and in the Body of a sound Man there is nothing Excrementitious, but only Alimentary blood is contained in his Veins, and al the parts of our Bodies are nourished only with blood.

the third concoction

This Blood in the several parts is elaborated according to the Nature of each part, and at length assimilated to the said parts. And seeing in that elaboration the blood undergoes some mutations, Physitians do say, that in the third Concoction the four secondary humors are generated; whereof the one follows the other, and by these mutations the blood is turned into the substance of the Body. The first is called the Nameless, the second Dew, the third Glew, the fourth Cambium.

the secondary humors.

the Excrements of the 3d Digestion.

In this Concoction two Excrements are generated, the one more gross, which is the filth that gathers about the Skin; the other more thin, which is discussed, partly by invisible transpiration, and partly by sweat. For the evacuation of which excrements the Skin was furnished with pores.

the generative faculty.

Moreover, That a man might propagate and multiply himself, he received from the Creator the Faculty of Generation. Now Generation is caused by seed elaborated in the stones, unto which out of the rest of the Body the best part of blood, spirit, and heat, is transmitted by the Veins, Arteries, and Nerves; and is by them reduced into a white froathy body,

full

ful of ſpirits, which is called ſeed and is a compendium as it were of all the Heat and Spirits in the Body.

This Seed is ſent forth both by the Man and Woman: for ſeeing Women are furniſhed with the ſame Inſtruments, both to make and vent Seed; and when they are provoked by Luſt they deſire Copulation, and void ſeed: we muſt needs grant that they contribute ſeed to Generation. And their ſeed goes to the making up of the Child: for the male and female are not two ſorts of Creatures: yet neither of their ſeeds is alone ſufficient for Generation, but this order is appointed by the Creator, that of both their ſeeds as two partial cauſes, one principle and one total cauſe ſhould ariſe, from which one motion (though in a certain orderly diſpoſition) ſhould further the production of the Child.

The Seeds conceived in the Womb are by the inbred faculty thereof cheriſhed, and the faculty lurking in the ſeed is ſtirred up, and the ſhape of the Organs begins to be expreſſed; and ſo conception is ſaid to be made, and then it is termed a Conception. Now the membranes encompaſſing the Child are firſt formed, in which the nobler part of the ſeed and ſpirit is included; and they are two, one called *Chorion* compaſſes the whol Child, props up the umbilical veſſels, and by their their means it totally adheres to the Womb: the other immediately compaſſing the Child is called *Amnios*; which Coats ſeeing in the Birth they ſeem to be but one, are termed the After-birth, becauſe they come away after the Child.

Now the ſpermatick parts are firſt formed and that all at once. And afterwards every part is finiſhed, as the dignity and neceſſity thereof requires. At firſt there appear as it were three bubbles, and innumerable threds, being the underwoof of the ſolid parts. Theſe parts do afterwards receive encreaſe from the mothers blood. And hereupon the Creator hath ordained, that from the fourteenth yeer commonly of a Womans age, to the five and fiftieth, there ſhould be ſome ſuperfluous blood as it were, bred in women, and afford matter for the Child in women that have conceived: or if a woman be not with Child that it ſhould be ſent unto the womb, and from thence purged away.

Since therefore the Child after it is once formed in the Seed is furniſhed from the mother with all things it ſtands in need of, there were navil veſſels made, viz. a Vein, two Arteries and the *Urachus*, which about the navil grow together into one. The Vein is a branch of *Vena Portæ*, to which it is contiguous, being the Nurſe (as it were) of the Infant: the two Arteries (branches of the *Ramus Iliacus*) deſcending do ſpring from the *Aorta*; whereby arterial blood and ſpirit are communicated to the Infant, and by which the Infant draws breath. The *Urachus* is carried from the bottom of the Bladder to the Navil; when the Child is born, there being no longer uſe of theſe Inſtruments for theſe intents, they grow together, and perform the office of the Ligaments as it were.

The Navil-veſſels
The Vein.
The Arteries.
The Urachus.

Now the whol time from the Conception to the Birth is divided by Phyſitians into two parts; the time of formation or ſhaping, from the Conception to the time the Child begins to ſtir; and the time of perfection, which is from the time it begins to ſtir, to the time it is born: yet others divide it into three parts, viz. into the time of Formation, which *Hippocrates, de natura pueri*, determines to be of Girls in forty daies, of Males in thirty: the time of motion which is commonly ſaid to be of Males in the third month, of Girls in the fourth: and thirdly, the time of birth.

The time of Formation.
The time of Motion.

Now as to the time of birth, that is various in mankind: yet experience teaches, that no Child is born alive before half a yeer be paſt. The Child born in the ſeventh month may live: but no Child born in the eighth month can live according to *Hippocrates*; yet ſome hold that the eighth months Child does ſometimes live. But the moſt orderly and frequent time of childing is the ninth month, and moſt Children are brought forth from the 15. of the ninth month, to the 15. of the tenth.

The time of Birth.

And although Phyſitians have obſerved that ſome have been born in the eleventh month and after the eleventh month: yet ſuch births are to be reckoned amongſt rare accidents.

How the months are reckoned.

Now the months according to which the times of Child-birth are reckoned are the ſolar months, or months of the Sun; from which nevertheleſs the lunar Conjunctions (conſiſting of twenty nine daies and twelve minuts) do not much vary. Nor muſt this laborious frame of mans body be tied to ſuch ſmal obſervances of time.

After the Natural faculty comes the Vital, being diſtinct from the Natural and Animal, both in actions and peculiar organs, and hath its ſeat in the Heart. Now under the term of vital faculty divers powers are comprehended; and there are in the Heart three faculties, the Wrathful, the Breeder of ſpirit and vital Heat, and Pulſing faculty which is ſubſervient hereunto.

three faculties in the Heart

the wrathful faculty From the wrathful faculty proceed al the passions of the mind, Anger, Manfuetude, Boldness, Fear, Hope, Dejection, Joy, Sadness, and others of this kind which follow the former. Now some of these are caused materially (that I may so speak) or in way of an efficient cause, by expansion of the Heat, Spirit and Blood, as Anger, Joy, and the like; some by the Concentration or gathering inward of the said Blood and Spirits, as Fear, Sadness, and the like: and formally they are all no other than Appetites; and these motions do follow an appetite, either of prosecuting that which delights, or of avoiding that which is hurtful; the former of which causes an expansion or spreading abroad of the Heat and Blood, and the latter causeth them to retire inwards. Now these motions cannot be made, save by agitation of the Heart and Arteries, and of fervent and spirituous Blood. Whence it is apparent why the wrathful faculty needs a very hot Bowel, and which is in continual motion.

Now the Heart is seated in the middle region of the Body, viz. in the Chest, that from it as a fountain the vital heat and spirit may readily be diffused into the whol Body. Now the Heart hath two Ventricles, the right and left: the right Ventricle out of the wide mouth of the *Vena cava* draws in Blood by its Diastole, which it perfectly concocts and attenuates: the thinner portion whereof is transmitted into the left Ventricle of the Heart, by those holes in the partition wall betwixt the two Ventricles; which nevertheless some deny: but the remaining and greatest part passes through the *Vena arteriosa* into the Lungs; some part whereof is spent in nourishing the Lungs, but for the greatest part is carried through the *arteria venosa* into the left Ventricle of the Heart.

the use of the Heart and its Ventricles.

the motion of the Heart. Now these things are performed by a certain wonderful and perpetual motion of the Heart, whereby in the Diastole its extream parts are contracted, and the point of the Heart is drawn to the Basis, and so the Heart becomes more short, but the sides thereof are dilated: but in the Systole the Heart becomes longer, and narrower. And seeing for the breeding of spirits and Arterial blood there is need both of Air and Blood, and these two substances cannot be drawn with one motion: besides the Ventricles which draw the Blood, on each side at the Basis of the Heart there are two notable cavities, ending into the upper part of the Ventricles, which by a peculiar motion of their own do draw to themselves Air to cherish the Spirits and fan the vital Heat, which are termed the Hearts Earlets. For although others say their use is to be as it were Store-houses of the Blood and Air flowing in, and guard the *Vena cava*, and the *Arteria venosa*: yet some conceive, that by a peculiar motion they draw in Air; and *Hippocrates* himself, *Lib. de corde*, holds that they cool the Heart like a pair of Bellows.

the Pericardium. And that the Heart may not be hindred in its motion, it hath allotted unto it a large and membranous Mansion, which they cal *Pericardium* the Heart-bag, which hinders any thing from pressing upon the Heart or troubling the same in its motion.

the four Vessels of the Heart. But seeing nothing could go into or come out of the Heart unless it had been furnished with certain conveighances: therefore in the Basis of the Heart four remarkable Vessels are seen, two in the right, and as many in the left Ventricle: In the right, the *Vena cava*, and the *Vena arteriosa*; in the left, the *Arteria magna*, and the *Arteria venosa*. The *Vena cava* is at the right Ventricle of the Heart, and pours Blood into the Heart, for the Generation of arterial Blood and vital Spirit and the nourishment of the Lungs. Howbeit others think the Blood which is wrought in this Ventricle is also distributed through the whol Body. Then there is the *Vena arterialis*, which carries blood out of the right Ventricle to the Lungs for to nourish them, as also to become the matter of arterial Blood and vital Spirit; the *Arteria venosa* carries Air from without and prepared in the Lungs, and Blood brought out of the right Ventricle of the Heart by the *Vena arteriosa*, into the left Ventricle, and expels smoaky exhalations, and distributes a portion of the vital Spirit into the Lungs. Finally there is the *Aorta* or *Arteria magna*, which distributes the vital Spirit and Arterial Blood bred in the left Ventricle through the whol Body: And these are (as *Hippocrates* sales) *Pegai Phusios Anthropou*, the *Fountains of the Nature of Man*.

Vena Arteriosa.

Arteria venosa

Arteria magna:

the Valves And seeing these Vessels have each of them two uses (for examples sake, the *Arteria venalis* doth not only draw Air out of the Lungs into the left Ventricle of the Heart, but it communicates vital spirit and arterial blood to the Lungs, and expels smoaky vapors) lest the substances entring the Heart should fal back the same way they came in before they have gained their perfection, or that which is shed out of the Heart might return thither again, there are eleven Valves placed in the orifices of the Vessels; three in the orifices of all the other Vessels, and only two in the *Arteria venosa*: Of which Valves some are open outwards and shut towards, namely those that pass the matter to the Heart; others are open within,

that

ſhut without, being ſuch as paſs matter from the Heart. In the orifice of the *Vena cava* are three Valves, open outwardly, ſhut inwardly; contrariwiſe, in the orifice of the *Vena Arterioſa* there are as many open within, ſhut without: in the orifice of the *Vena arterioſa* there are as many, open within ſhut without: in the orifice of the *Arteria venoſa* there are two, which are open without, ſhut within; in the orifice of the *Arteria magna* are three Valves, open within ſhut without.

the Branches of Arteria magna.

And becauſe the Heart diſtributes Heat and Spirit through the Arteries into the whol Body, there are paſſages made to carry the ſame, viz. the Branches of the great Arterie, which themſelves alſo are dilated and contracted, and by the pores of the Skin draw in Air, expel ſmoaky vapors, and communicate to the whol body vital Spirit, Heat, and Arterial Blood; and this motion of the Heart and Arteries is termed the Pulſe.

Of what motions the Pulſe doth conſiſt.

Now the Pulſe conſiſts of two motions, Syſtole and Diaſtole. By the Diaſtole or dilatation the Heart is filled, and draws Air and Blood out of the Lungs by the *Arteria venoſa*; and the Arteries by their orifices, which end in the Skin, do draw ſome of the ambient Air: but by the Syſtole or Compreſſion the Heart diſtributes vital Spirit and Heat through the whol body, by the *Arteria magna*, and expels fuliginous excrements to the Lungs, by the *Arteria venalis*: alſo the Arteries expel fuliginous excrements by their orifices, which action is termed *adelos diapnoe*, inſenſible Tranſpiration.

the chief Organ of Reſpiration.

But becauſe the Air, which is drawn by the Heart, was to be altered before it came thither, therefore the Lungs were given, and Reſpiration ordained. The chief Organ of reſpiration is the Lungs. For although the Cheſt and other parts do alſo ſerve for reſpiration: yet that motion is primarily performed by the Lungs, which have a peculiar faculty to dilate and contract themſelves, as the Heart and Brain alſo have: which may eaſily be obſerved in the diſſection of Live-anatomies. Nor is reſpiration a voluntary motion, ſo that the Lungs ſhould dilate themſelves upon the motion of the Cheſt, to avoid *Vacuum*; but the Lungs are moved by a proper power of their own, and the Lungs and Cheſt are moved together, becauſe they conſpire both to one end. For the Lungs by an inbred faculty are dilated: and that it might be done more conveniently, and that it might have room wherein to dilate it ſelf, when the Lungs move, the animal faculty at the ſame time moves the Cheſt. And indeed theſe two motions hold proportion one to another. Nor are the Lungs diſtended becauſe they are filled, as a Bladder that is blown up; becauſe Air is not from any place blown into the Lungs: but they are filled becauſe they are dilated, after the manner of a pair of Bellows.

Reſpiration no voluntary motion.

Reſpiration made up of two motions.

Now reſpiration conſiſts of two Motions, Inſpiration and expiration. By Inſpiration the Lungs and Cheſt being widened, Air is drawn in by the Mouth and Noſtrils for to cool the Heart and to make vital Spirit: and by Expiration, the Lungs and Cheſt being compreſſed, fuliginous excrements are voided at the Mouth and Noſtrils. Hence, that much Air might be attracted and retained therein, the Lungs exceed all the Bowels in greatneſs, and have a rare and porous ſubſtance.

the Aſpera Arteria.

And becauſe the Air was to have an Ingreſs into the Lungs, therefore was the Weſand [*Aſpera arteria*] or Wind-pipe made; whoſe larger Trunk might receive Air, partly by the Mouth and partly by the Noſtrils; and other branches innumerable are diſtributed into all the parts of the Lungs, that they might be totally repleniſhed with Air; which Air the Veſſels coming from the Heart to the Lungs, being large and great, do receive at their ends, and carry it into the Ventricles of the Heart.

And becauſe a man perpetually needs to draw in the Air, the Weſand is made of ſolid griſly rings, that it may be kept perpetually wide and gaping.

the Epiglottis.

But leſt the Meat or Drink in paſſing over the Wind-pipe ſhould fall thereinto, whereby a mans life might be endangered: on the top thereof a ſoft and ſharp-pointed Griſle is placed ſticking out, which they cal *Epiglottis*, which covers the paſſage of the Wind-pipe, while Meat or Drink ſlips over it.

the Cheſt.

Now the Cheſt, ſince it was to be partly a defence of the vital parts and partly the Inſtrument of Reſpiration; it was to be neither quite fleſhy nor quite boney. Therefore the Cheſt doth conſiſt of twelve pair of Ribs, which that they might come and go to dilate and contract the Breaſt, ſixty five Muſcles were made, thirty two whereof diſtend, and as many contract the Cheſt.

Its Ribs and Muſcles.

the Midrif

But becauſe there are no Ribs in the lower part of the Breaſt; that there might be in that place alſo a part that might be diſtended and contracted, and might likewiſe ſeparate the vital Organs from the lower Belly, a certain partition wall is interpoſed of a muſculous or fleſhy ſubſtance, which is called the Midrif, which when the Air is breathed forth

is raised up, but being loosened it is dilated, and depressed in Inspiration or drawing in of the Air, or fetching wind. And because through the *Diaphragma*, near the Back, the Gullet, the *Arteria magna*, and *Vena Cava* do pass, lest by the perpetual motion of the *Diaphragma* these parts should be straitened and agitated, the middle of the *Diaphragma* is Membranous, and contains no fleshy substance, that though the musculous part of the Diaphragme or Midrif is moved, yet that part may not be contracted.

Having done with the Vital Function, it follows in the next place, that we enquire by what means and with what Instruments the operations of the sensitive faculty are performed. And in the first place, that the Instrument of feeling which is the most common sense is a Membrane, hath been said already in Book 7. Chap. 6. But as to the Skin, 'tis true indeed that it is folded about the whol Body, not only that it may cloath the whol Body, and defend the other parts from external injuries, and that it may fasten and bind al the parts together; but also that it may be the Instrument of feeling, and may perceive external objects and injuries every way incident. And *Galen* rightly said 1. *de temper. cap. 9.* that the Skin, especially that in the hand, is the Rule of al sensible objects, and an Instrument of feeling properly fitted for so prudent a Creature as Man is. Yet nevertheless in that the Skin feels, it does it because it is Membranous, or receives fibres and little Nervous Membranes from the parts beneath it.

The Skin is not the adequate instrument of feeling.

The parts and use of the tongue

The Tongue is the Instrument of Tasting, whose flesh is spungy, rare and loose, covered by a most thin Membrane, common to the Mouth and Pallat, into which the Nerves of the third and fourth Conjugation are expanded. Now the Tongue hath three pair of Nerves; the former two are disseminated through the Coat thereof, and serve the Tasting Faculty: the third is spred into the Muscles of the Tongue for to move the same.

That the Organs of the Smel are the Mammillary Processes, was said before in Book 7. chap. 4.

The Organ of Hearing, its parts and use.

the implanted air

The adequate Organ of the Hearing is indeed the whol Ear. But what is the chief part in the Ear that contributes to Hearing, Authors are at great variance, while some say the implanted Air, others a certain Nerve is the immediate Instrument of Hearing. But if we shal diligently weigh the matter, these Opinions may be some waies reconciled, as was said *Lib. 7. cap. 3.* For it is altogether probable that a certain implanted Air or aery substance is required to cause the Sense of Hearing. For as to receive the visible Species the Organ of Sight is shining and lightsom; so also to receive sounds, 'tis credible that the Organ of Hearing is Aerial. But seeing the Organ of a Sense ought to be a part similar and animated, simple Air cannot be the Organ of Hearing; but it must be a certain Aery substance, bred of the most pure and Aery part of the Seed and maternal blood, such as may have affinity with the external Air, and may receive the sounds brought in. But whether this ingrafted Air be in the expanded Nerve, or in some Cavity, can hardly be determined; since Anatomy in this point affords little help, and after death we find nothing obvious to the sight. Whence also it is that that same other Question can hardly be resolved; Whether this Air be only an internal Medium, to receive and transmit sounds to the true Organ of Hearing, which is the widened end of the Auditory Nerve? or, Whether (which is the Opinion of *Capivaccius*) this Air it self seated in the expanded Nerve be the Organ of Hearing?

the external Ear

All the other parts of the Ear have each their use in Hearing. The external Ears by their sticking out do receive the sound, and cause it to rebound into the Auditory passage. Hence those that are crop-eared, or have their Earlaps cut off, they do not hear exactly, but perceive sounds like fluctuating Water.

the auditory passage or hole.

the Drum.

From the outward Ear or Earlap, the sound comes first into the Auditory hole, which is boney and covered with a thin Skin compact and smooth, and which sticks exceeding fast to the bone, fit to receive sounds. At the end of this hole or passage is a Membrane which they cal the Drum, made to this end, That the external Air might not slip into the Cavity of the Ear, and so disturb the Hearing.

Now this Membrane is exceeding dry that it may rightly receive sounds: for Instruments of Musick teach us, that the driest things are most apt to sound.

the three little bones of the Ear

No man can easily tel the use of the rest of the parts of the Ear, *viz.* The Cavities, the three little bones called the Mallet, the Anvil, the stirrup; since we have no such helps here as Looking-Glasses, Optical Glasses, and such like do afford us in our explication of the Instruments of sight.

the parts of the Eye, and their uses.

Somwhat we have spoken concerning the sight, Book 7. chap. 2. Its Instrument is the Eye; which hath many parts, each of which hath its peculiar use. The first is the *Cornea Tunica*, or Horny Coat of the Eye, which is transparent and void of al color, that the visible species

ſpecies may paſs there-through into the Eye, and that pure and uninfected with any ſtrange color. It is thicker than the Air, that the ſpecies comming out of the Air (a thinner Medium) into a thicker might be refracted.

the watry humor.

Betwixt the Horny Coat, and the Criſtalline Humor, the watry humor is placed in the middle, tranſparent and void of color for the Reaſon aforeſaid touching the *Cornea*. Now it is thinner than the *Cornea*, that here alſo may be a new refraction of Raies.

the Uvea tunica.

Next the watry humor comes the *Uvea Tunica* or Grape-skin Coat, which is furniſhed with ſuch a blackneſs as is not to be ſeen in al the body beſides, to the end the ſpecies might become more clear, and appear better in the Criſtalline humor. For weak Lights do more appear in an obſcure darkiſh place than in a lightſom. Alſo this Coat ſeems to have another End, *viz.* That over much light which might enter in at the Apple of the Eye, and offend the Eye and the ſight, might by this black Coat be intercepted.

the Apple of the Eye.

In the *Uvea* or the Grape-skin Coat, there is an hole which is called the Apple of the Eye, being the door as it were by which the viſible ſpecies do enter into the Eye. This hole (that the ſight may be more perfect and diſtinct) is much leſs than the compaſs of the *Cornea*: Yet in ſome it is larger, in others narrower; and thoſe that have it narrower do ſee more ſharply, thoſe that have it broad are weak-ſighted.

why it widens and narrows.

Now the *Pupilla* or Apple of the Eye is ſtraitened and widened, and in a light place appears narrower, in an obſcure place wider: For ſeeing two much light hurts the ſight, and a weak light is not ſufficient for ſight, and in an obſcure place the viſible object is not ſufficiently diſcerned; this Window (as it were) is made in the entrance of the Eye, which may be widened and narrowed, and by widening let in ſo much light in an obſcure place as may be ſufficient for ſight; and by narrowing exclude too much Light which may offend the ſight.

And in regard of this Conſtitution of the *Uvea Tunica*, there are three natural manners of ſight; one is moſt perfect, being conſtituted in an indiviſible point, and whereby we diſcern diſtinctly the ſmalleſt things: The other is perfect, when we ſee viſible objects at a juſt diſtance, and can diſtinguiſh them though we do not diſcern the ſmalleſt part of every of them: The third is imperfect and confuſed, whereby beſides things juſt againſt us (which we ſee perfectly) we do alſo confuſedly diſcern things on either ſide of us; and for this ſights ſake the Horny Coat is broader than the *Uvea* or Grape-skin Coat, to the intent that at one view we may behold divers things, though not al diſtinctly.

Now this is the Cauſe of this Difference. Seeing the comprehenſion of a viſible thing is made by a Pyramid; and the certification by its *Axis*; and only that perpendicular Line which is called the *Axis*, and which is not refracted, does effectually, plainly, and diſtinctly repreſent the thing; but other Raies, by how much they are neerer to, or further from it, by ſo much the ſtronger or weaker they are in repreſenting: hence doubtleſs it comes to paſs that when the Apple of the Eye is narrower, only the perpendicular in the Pyramid of ſight does enter, or with it the Raies which are neareſt the *Axis*; when the Apple is wider, more Raies (oblique and refracted) do enter with the perpendicular.

the Criſtalline Humor.

Next the *Uvea* is the Criſtalline Humor, which is not ſeated (as ſome imagine) in the Centre of the Eye, but in the fore part, and the Membrane compaſſing the ſame divides the Eye into two unequal parts, the foremoſt whereof is fourfold leſſer than the hindermoſt. And as to the uſe and office of the Criſtalline Humor, Authors do not a little vary: For ſome (and the greateſt part) do hold that this Humor is the chief Inſtrument of ſight, and that therein only the ſpecies are received and diſcerned: Others (ſeeing that the Glaſſie Humor is alſo tranſparent, and much greater than the Criſtalline, and placed behind the ſame) are of Opinion that the ſight is not terminated in the Criſtalline, but that the viſible ſpecies paſſing through the Criſtalline are received in the Glaſſie Humor, and being refracted are gathered into one point, and received by the Optick Nerve: which Opinion ſeems to be very probable. For ſeeing refraction is exceeding neceſſary to ſight; al this furniture of the Eye, and the variety of tranſparent parts therein was contrived, that divers refractions might be made. And hence alſo the Criſtalline Humor is more compact than the Watry, that a new refraction might be made therein.

whether it be the chief Inſtrument of ſight?

the Glaſſie Humor.

This Criſtalline Humor is ſeated in the fore part of the Glaſſie Humor, ſo called becauſe it reſembles melted Glaſs. Its ſubſtance is ſofter than the Criſtalline, and leſs fluid than the Watro. The Quantity hereof is ſo great, that it takes up almoſt three quarters of the Cavities of the Eyes. *Galen* and many others have hitherto thought, that this Humor was made to nouriſh the Criſtalline; but falſly: For what need was there of ſo great a quantity of the Glaſſie humor, if it were only to nouriſh the Criſtalline? alſo the Criſtalline Humor

mor

mor might be nouriſhed by a much readier way; nor needed ſo laborious a contrivance of the Glaſſie Humor, if it were made only for nouriſhment: nor is there any example in the whol Body of one part nouriſhing another, but they al draw their nouriſhment from the Veins, whether they be white or red. The Opinion therefore of others ſeems to be truer, who hold, That the Vitreous or Glaſſie Humor hath received this ſhape, place, and quantity, that therein the viſible Images or Raies being refracted out of the Criſtalline into the Glaſſie, which is leſs compact than the Criſtalline, might meet together in one point, and after that manner be offered to the ſight.

the Optick Nerves. The Optick Nerves ariſe from the hinder part of the Brain, and going forward a long way, they are at laſt inſerted into the Eyes. Theſe Nerves after they are gone a little from their original are joyned together, not by ſticking one to another, or croſſing one another, but by an abſolute Union; but ſoon after they are again ſeparated, and being divided, the right goes to the right Eye, the left to the left. And ſome wil have the reaſon to be, leſt viſible objects ſhould appear double becauſe there are two eyes. But ſeeing theſe Nerves are not joyned in their beginning, but on their way, it is more probable that the reaſon thereof is, That the Optick Spirit (when need is) might be ſent totally wel near into one Eye, that ſo the ſight may be ſtronger in one Eye; which comes to paſs when we ſhut one eye, that we may ſee a thing more accurately with the other.

But ſince Sight is made right forward, if the Eyes were immovable, we ſhould be able to ſee only ſuch things as are juſt againſt us. To the end therefore the Eye might ſee more things and that diſtinctly, it is furniſhed with Muſcles whereby it may be moved. And becauſe the Eye was not capable of al the differences of motions; ſuch as they want are ſupplied by the motion of the Head. But that one thing ſeen by the two Eyes may not appear double, both the Eyes are alwaies naturally moved to the ſame differences of poſition: and therefore the Nerves by which they are moved ariſe from the fore part of the Spinal Marrow, joyned together in one point as it were, that ſo they may agree together in every motion.

the Eye-lids: There are alſo beſides, certain outward parts ordained to aſſiſt the Sight, viz. Two Eye-lids, the upper and the lower: of which the upper is only movable; the uſe of which is to defend the Eyes from external injuries, as Air, Wind, Smoak, Duſt. Howbeit, ſome add alſo another uſe, viz. To purifie the Eyes: For ſince ſight requires a pure tranſparent body, and the Horny Coat is eaſily dimmed by reaſon of the moiſture which ſweats out of the Kernel, as alſo by the external Air: in the opening of the Eye they conceive the Eyelid wipes al foulneſs from the *Cornea Tunica*.

After the external Senſes come the internal, of which we have ſpoken, Book 7. chap. 7. The immediate Inſtrument by which, and in which they are exerciſed, is the Brain, which for the performance of theſe Functions is furniſhed with a peculiar ſubſtance, the like whereof is not to be found in the whol Body again.

the Brain: Now the Brain of a Man, the ſubſtance whereof is ſoft and white, in reſpect of the bulk of his body is exceeding great; becauſe Man-kind is more exerciſed in Animal actions than other living Creatures, and therefore needs great plenty of ſpirits, which cannot be bred but of much matter, and in a large place.

Its uſe. Now the Brain is made to perform the actions of the inner Senſes, and of the Rational Faculty, and to generate Animal Spirits, which are the immediate Inſtrument of theſe actions. And the Brain is moved by a Natural and peculiar motion for the better generation of Animal Spirits, and like the Heart in its Diaſtole it draws matter for the generation of ſpirits, and in its Syſtole it pours out the Spirits into the Organs of the Senſes.

Its parts. Now the Brain is divided into three parts. And the firſt is divided by the *Dura Mater* into the foremoſt and hindermoſt part: The foremoſt, in which the Spirits are chiefly generated, is called by the name of the whol *Cerebrum* or the Brain: the latter *Cerebellum*, the Brainlet or petty Brain. Moreover the Brain is again divided by the *Dura Mater* into two equal parts, the Right and the Left. The Brain hath alſo its Ventricles and other parts, which are all moſt diligently deſcribed by Anatomiſts, nor can they be here briefly recited, nor wel underſtood without ocular inſpection and figures.

In what part of the Brain the Animal functions are exerciſed. But let us here firſt enquire in what part of the Brain the Animal actions are performed. The vulgar Opinion is, That they are performed in the Ventricles: in which alſo they hold the Animal Spirits are generated of the Air drawn in and fetching breath, and carried into the Brain by the Organ of Smelling, and of vital Spirit ſent up from the Heart by the Carotick Arteries; and ſo they commonly hold the Ventricles of the Brain to be the Store-houſes as it were of the Spirits Animal. But late Anatomiſts having diligently weighed the Conforma-

tion

tion of the Brain, have left the said Opinion. For seeing nothing reaches into the Ventricles of the Brain, besides the Kernels, and that they have no passage save at the Tunnel and the kernel thereof (which by the consent of al receives flegm out of the Brain) it easily appears from hence, that those two remarkable Cavities (which are called Ventricles) were made to receive the excrements of the Brain: and that therefore they cannot also be the Shop and place of Animal Spirits. And therefore more likely it is, That the Animal Spirits are bred in the substance of the Brain it self, and that therein they are contained and perform their Functions.

whether the principal Faculties have different places in the Brain.

Moreover, it is also controverted; Whether al the Functions which belong to the Brain are performed in one part thereof? or whether they are exercised distinctly in distinct places? Some wil indeed have it, That the Faculties have several places, and they quarter the Fancy in the fore part of the Brain, Reason in the middle, Memory behind. And this makes them think so, because one action being hurt, the rest do remain sound. Others quarter al these actions together, seeing they are exercised about the same objects: Who indeed deny not that one action may be hurt, and the rest unhurt; but they say, this does not therefore happen because they are in several places, but because each action requires a peculiar dispostion in the Organ; whence it may happen, that one preternatural Disposition may hurt one action more than another; as for examples sake, moisture is more hurtful to the Memory than to the Fancy.

The common sense in the fore part.

The Memory, Fancy, & Reason not distinguished in their seats.

Now although it is hard to determine any thing in this Case, and we must needs confess as in most other things, so in this, as *Scaliger* hath it, *Exercitat.* 307. *Sect.* 21. We like the Wolf deluded by the Stork do lick the Glass, but cannot touch the Gruel: yet it seems most probable that the common sense is placed in the fore part of the Brain, seeing there al the external senses concur, whose Centre (as it were) the common sense is. But the other actions seem not to differ in their seats, seeing they are conversant about the same objects.

Ratiocination is performed without corporeal Organs.

There remains the most noble and proper action of a Man, Ratiocination, or Intellection, which is performed (doubtless) without the help of any Corporeal Organs. For the Mind does not understand by the Body or any part thereof, as the Medium wherewith. The Mind of Man indeed stands in need of a Phantasm (because the Soul while it is in the Body never understands without a Phantasm) but uses the same, not as an Organ, but as an Object: For if the Intellect were tied to any Organ, by help whereof it acted, it could not understand al things: but according to the determinate disposition thereof it should act and only understand some things: as the Sight by the Eye perceives only colored things, and nothing else.

the seat of the understanding.

And although after this manner we cannot assign any place to the Intellect: yet by accident and consequentially a certain seat is ascribed thereto, viz. That wherein the Imagination is made. Imagination and Ratiocination are joyned together in one Seat, and Reasoning is said to be performed in the Brain, rather than in the Foot or Liver; because in the Brain Phantasms are offered thereunto, which it contemplates, but not in the Foot or Liver.

the Instrument of Animal Motion.

After the knowing Faculty of the Soul, there remains yet Appetite and local motion, of which we spake in Book 7. chap. 8. where also it is said, That a Muscle is the Instrument of voluntary motion. And seeing there are four motions of Muscles, so that they are either contracted, or extended, or transferred, or remain bent, as *Galen* teaches in *Lib.* 1. *de motu muscul. cap.* 8. Yet Contraction, whereby a Muscle is drawn towards its head and proper Original, is the proper action thereof, by which the parts are turned any way as occasion requires. Now there is a great number of Muscles, by reason of the variety of the parts to be moved, and their sundry motions; and some move the Thighs, others the Arms and Hands, others the Back, Breast, Head, Jaws, and other Parts.

Its Fountain.

Motion flows from the same Principle that Sense does, viz. From the Brain; howbeit, from the hinder part thereof peculiarly termed the Brainlet or *Cerebellum*; and the Nerves arising therefrom are more solid, and are diffused through the substance of the Muscles.

the Legs.

And that the Body might be transferred from place to place, a Man hath Legs given him which are made of most strong Bones, to support the whol Body, and carry it from place to place; which that they might not be too heavy, are made hollow within.

the Feet.

And that a Man might stand firm and upright, and not totter as he goes, he hath Feet joyned to his Legs, which are hollow in the middle, so that a Man staies himself upon four props as it were: For when a Man moves forward, he sets the former part of his Feet more firmly to the ground, and bears most upon them.

their joynings.

And that the Feet may be variously moved, divers articulations are made. For we go into low places by bending our Knee; after lying or sitting we raise our selves up: which could

not be if our Leg and Thigh were not joynted. So we set our Foot more forward or backward, as the ground is up-hill or down-hill. Also the hollow part of the Foot when we go upon pointed things, or uneven bodies, laies hold on them as it were an hand; and after the same manner also we go up a ladder. And therefore the Foot (as a Hand) is divided into five Toes, which when we go do fasten upon the ground like hooks; and are also the cause that we can go upon rough and uneven places as wel as those that are plain and smooth. Now in the Toes of the Feet, the great Toe is not set against the other four as in the Hand, but they are al placed on a row after the same manner. For the Hand being the Organ of taking hold, and the Foot of walking; as in laying hold a great variety of motion, so in walking the firmness and security of support is requisite. Moreover, that the Feet might accommodate themselves to the variety of the ground whereon a Man goes; besides Toes they are compounded of divers Bones, in respect of which they are sometimes bended, sometimes extended.

the Hand. And because Man only of al living Creatures is endued with Reason, he also alone hath an Instrument of laying hold or taking up, which are the Hands, the Instruments of Instruments, by which only he can supply himself with whatever other Creatures naturally have more than he, as to defend or cloath themselves. Now two Hands are made, that if one wil not serve to hold a thing, both may. Again, they are variously distinguished, that we may take up great things and little things, and bodies of what figure soever. Likewise against the four Fingers the Thumb is placed opposite; because whatever we handle, either we enclose it circularly with our hand, or fasten our Fingers upon it on the opposite sides.

Speech & the usefulneß therof. Moreover, from the Motion of the Will Speech hath its original, wherewith we may conclude this our Epitomy: which as it is proper to man alone; so is it most profitable, and most highly necessary to preserve the Societies of Man-kind: For Speech was given us that we might demand of others such things as we wanted; and signifie what we had that we were willing to impart. And as *Scaliger* saies, in *Exercitat.* 256. from *Aristotle*: *Reason is the Hand of the Understanding; and Speech, of Reason; and the Hand, of Speech. For the Hands perform what they are commanded; the Commands obey Reason: Reason is the force of the Intellect.*

the remote Instruments of the voyce Now the Instruments of the Voyce and Speech, are some remote and common, others near and proper. The former are the Instruments of Respiration, the Lungs and the Chest, and those parts pertaining to these, the Midrif and the Intercostal Muscles; which do not frame the voyce, but afford Spirit and Air which are necessary to the formation thereof.

the near or immediate Instruments: Now the near are the Wezand, the Larynx, the Muscles which open and shut the Larynx, the recurrent Nerves, the *Epiglottis* and the Tongue. To which some others are subservient, as the Palat and the *Uvula*. Amongst the most immediate are the Larynx, and especially the *Epiglottis*, which is like the tongue of a pipe: For a pipe without a tongue is useless, nor can the voyce be framed unless the passage of the spirit or air be made narrow.

For Air and Spirit are required as matter to frame the Voyce: Instruments are necessary to drive it forth, which are the Lungs and Chest: there is need of an Instrument wherein it may be smitten, and wherein being smitten the Air may sound; which is the *Larynx*, whose orifice being straitened, and the Air smitten, the Voyce is caused. And because the Case so required that a man was not alwaies to speak, but when he lifted, the *Larynx* hath many Muscles, by which the chink of the *Larynx* may be widened and straitened as we please, and so sundry Voyces framed.

But because the Voyce of Man was to be articulate, to signifie the conceptions of his Mind, therefore his Tongue was framed with Muscles to move the same, wherewith being moved it variously opposes it self to the voyce issuing out of the *Larynx*, and so frames an articulate speech: to the formation whereof the Lips do also serve, which do themselves also oppose the voyce, and with their motion precede, accompany, or come after the motion of the Tongue, as the Nature of the Articulated Speech requires.

FINIS.

NATURAL PHILOSOPHICAL DISCOURSES.

The INTRODUCTION.

IT hath been both by me and others elſwhere at large declared, That there are two things which chiefly draw the minds of men from Truth, and hinder the growth of all Diſciplines; viz. A Servile kind of Credulity, and a raſh deſire of Innovation. How much hurt both of theſe have done to other Diſciplines, let thoſe ſpeak that are skilled in them. That I may ſpeak of Natural Philoſophy and Phyſick, which belong to my Profeſſion; it cannot be denied but that much hurt hath been done to both theſe, eſpecially to Natural Philoſophy, whiles ſome Men little regarding Reaſon and Experience, have ſolely adhered to the Authority of other Men; others out of a deſire of novelty have endeavored wholly to overthrow the foundations of ancient Diſcipline. From both theſe courſes I freely profeſs my ſelf to have been alwaies averſe: For neither would I be of the number of thoſe raſh Innovators, whether Paracelſians or Chymiſts, or how ever otherwiſe called, who endeavor wholly to baniſh from the Schools the ancient Philoſophy, which is come to us chiefly from the Writings of Ariſtotle: nor yet would I be reckoned amongſt them who are not aſhamed in this Age of ours publickly to profeſs, that they had rather err with Ariſtotle and Galen, than ſpeak the Truth with any later Author. The Innovators aforeſaid I paſs over at preſent. Touching theſe latter, I conceive Julius Cæſar Scaliger hath well written in Exercit. 306. That thoſe Wits are moſt unhappy which ſtifly maintain, That our Anceſtors knew al things. I do not verily envy Ariſtotle thoſe praiſes wherewith the ſame Scaliger every where adorns him. Let us grant that Ariſtotle is a man that hath deſerved more than all mortal men beſides, of all the parts of Humane Knowledg; that he is the Father and Captain of our Wiſdom; that he is the chief Dictator of Learning, the Emperor of Philoſophers; that he is the Eagle of the Philoſophical Kingdom of Wiſdom, and Literary praiſe; that he is the Hercules, the Prince, the Tribunal of Truth; that he is the god of Philoſophers; and in a word, greater than all praiſe, and above all Calumny: yet neither he nor any mortal Man can be made the Rule of Truth. Let it be counted a comely and a decent thing to cite the Teſtimonies of Ariſtotle as of a prime Philoſopher for his Opinion, and to produce as many of them as may be: but if weighty reaſons be not added, a mind deſirous of the Truth will not be contented with theſe alone. Their Courſe therefore is by no means approvable, who taking no care for reaſons, contend only with Authorities. Yet this is a fault common enough. For if we look into the Writings of ſome Men we ſee nothing brought to prove their Matter, but the Authorities of Hippocrates, Ariſtotle, and Galen, and oftentimes many interpretations are alleadged touching the ſence of ſome one place, and all thoſe rejected, and at laſt another ſubſtituted, perhaps no better than the former, and ſo in diſputing thereabouts pro and con, ſo many Pages are taken up, that he muſt have abundance of leiſure that would read them all. And which is a ridiculous thing, the contention is not ſo much about the mind of the

Author speaking in his own Language, as the Interpretation of a barbarous and faulty translation, which is obtruded for the mind of the Author; and so they play at Blind-mans Buff.

So much reverence ought indeed to be afforded Aristotle, that if any thing seems by him inconveniently expressed, it be softened with a fit Interpretation. But if the matter be plain, (only some opinion of Aristotle doth not agree with the truth)'tis vain to labor to fix another sence upon Aristotle. And that which is the top of all the mischief, you shal find such opinions given out every where for Aristotelean, which are no where extant in Aristotle, being the Inventions of School-men, whose custom hath been to delight themselves in disputing al things pro and con.

Which thing, as I said, doth not a little hinder the progress of al disciplne; whiles both our time is lavishly wasted, and consumed without profit, of which we ought to be sparing Stewards, since life is short and Art is long; and we wander from the way of finding the truth. For there are two Principles only of finding out all truth, and Touch-stones of all opinions, Reason and Experience. He that follows these two doth not easily err: but they who neglecting these do fly to that external Argument, viz. Authority, and like Slaves swear to the sayings of one man, and of a Man make a kind of God, who cannot be deceived; they easily slip into sundry Errors. Hence (to speak nothing of Physick or other parts of Philosphy, but to keep me to natural Philosophy, for whose sake I speak all this) amongst the Expounders of Aristotle (whom all the Philosophers wel nigh of all Nations for some ages last past have believed so to have perfected this part of Philosophy, that there needs no further labor but to understand his writings) so many dissentions and so many indissoluble objections, to and fro, have arisen, which in so many ages of years have not been ended, but that dayly they have divided into many sects, while disputing upon the suppositions of several sects, one man will maintain one way, another man another; this man being for Averrhoes, a second for Thomas Aquinas, a third for Scotus, a fourth for another; that you cannot tel whom to give credit to. And that is true of Euripides, One man sees not all things. And no man hath ever been found, that hath not erred and mistaken, or as Galen hath it: It is hard for him that is a Man not to offend in many things, viz. being quite ignorant of some, judging amiss of others, and negligently letting down other things in writing. And therefore when free and excellent wits, and prudent Men had observed, that the Authorities of the Ancients had hitherto more bindered than furthered the Advancement of Learning; and saw that thereby a Bridle was cast upon the Understanding of Man, and upon many excellent wits; they endeavored to cast off this yoke of Bondage, and to seek the knowledg of things from the things themselves.

Yet they themselves also who have not followed only Authorities but weighed the Things themselves have not al happily touched the white of Truth. For seeing, as hath been said, Reason and Experience is the Rule of Truth in matters of Nature: Experience must of necessity precede, and when a thing is so found out, Reason is to prove the same: wherin nevertheless many offend; for seeing many neglect Experience, and rely only upon Reasons, & give too much credit to their speculations, they must of necessity be very often deceived. Of which thing we have every where remarkable Documents; some of old trusting to certain sleight reasons denied there were Antipodes; amongst whom was Lactantius, who largely inveighs against those Philosophers who held there were Antipodes, in Divin. Institut. Lib. 3. cap. 24. & counts those men fools who beleeved there were such Antipodes who hung by their Legs, and whose Feet were higher than their Heads: and cals it folly & vanity to hold there were Men in the world who went with their Feet just against ours. And Augustine de Civitate Dei Lib. 16. Cap. 9. counts it fabulous to beleeve, that there were men on the other side of the Earth, who went with their Feet against ours. Yea and Aventinus relates, that there was one Vigilius a learned Man, who could not avoid the thunder-bolt of Excommunication, for holding that Men lived about the Globe of the Earth and went with their Feet one against another. For Pope Zachary writ to Boniface, to drive Vigilius from the Church as an Heretick, and to deprive him of his Priesthood, unless he would abandon his perverse Doctrine. So, in the foregoing ages some endeavored by sleight reasons to perswade that the torrid Zone was not inhabited; both which Experience and late Navigations have taught to be false. So some idle Monks and others of the last ages preceding, taught many things, trusting to their speculations, concerning the Body of Man, which Experience and Anatomy do shew to be false. Jacobus Zabarella a most learned Interpreter of Aristotle acknowledged this Error, who in Lib. 2. de propos. necess. cap. 17. thus writes:

All

All these things are so true, that all men ought to know them by Inspection of the things themselves, if in these daies we had Philosophers, who Philosophied by searching diligently into the Natures of things; and did not only addict themselves to the words of *Aristotle*, and those many times misunderstood, to which they are wont to accommodate the things themselves; seeking nothing else but what *Aristotle* saith, and taking their Arguments for the knowledg and proof of all things, only from his words. *The Premises considered, not out of any desire to inveigh against and carp at* Aristotle *(whom I reverence as much as any man can) or any other Persons, but only out of desire to find out the Truth, I began more diligently to examin certain things referring to some Controverted Heads of natural Philosophy. For although somwhat above thirty yeers ago, I collected a certain Epitomy of natural Philosophy, and afterwards published the same: yet the reading of other Authors and especially of Physitians (who have handled natural Philosophy more diligently than other men, and are therefore called Physitians, that is to say, Naturalists) the Consideration of natural things, and exercise of chymical Operations, and in a word, Experience hath taught me many things; so that to use the words of the Comick Poet,* Such things as I thought I knew, I am ignorant of, and such things as I had an high conceit of, Experience teaches me to reject. *I conceive indeed, that the most things I wrote in that smal Epitomy are agreeable to Nature; but yet I suppose there are some things which may be more rightly, or cleerly expressed. Whereof, I think I am not to be blamed for admonishing my Reader; since very many most learned men have done the same before me, which therefore I thought fit briefly to comprize and joyn as an auxiliary Appendix to the foresaid Epitomy, and those things especially, which concern the Principles and Foundations of natural Philosophy, not only general, but special also. For the chief cause why natural Philosophy is so little improved, I conceive to be, that in the former Ages those who accounted themselves the most acute, consumed the greatest part of their life in those general Questions, concerning the first Matter, Form, Privation, Motion, and such like, and wasted the time in repeating those Disputations over and over again, after a most tedious manner; but things particular or the sorts of natural things (out of the Observation whereof they ought nevertheless to have constituted their principles) they never medled withall to any purpose. And hence it came to pass that so many Wainloads of Commentaries arose upon* Aristotle's *books of general natural Philosophy, filled for the most part with Questions rather Metaphysical than Natural, and many times with vain speculations. But few were found that would read or Comment upon* Aristotle's *books of Meteors, of the History of living things, of the Parts of living things, of the Generation of living things, or of Plants; scarce so many in number,*

As Gates of *Thebes*, or Heads of fruitful *Nile*.

And although I know, that by these my endeavors I shal lay my self open to the Calumnies of many, and that I shal be counted an Innovator and an Inventer of Paradoxes: yet I have not thought fit therefore to forsake the study of truth. For Aristotle *wel saies in* 1. Ethicorum cap. 4. It is a good thing, yea and our Duty, for maintainance of Truth, to change and abolish our former Opinions and Tenets. *Which things he taught not only by word and writing, but by Deed and Action. For although* Aristotle *heard* Plato *teach twenty yeers together; yet he suffered not himself to be brought into bondage by the Authority of his Master, but he freely enquired into the Tenets of him and al other Philosophers before him, opposed them at pleasure and rejected them, substituting in their rooms such things as he thought most probable. And therefore we that follow, do ow no more Reverence to* Aristotle *than he did to his Predecessors; but we ought so to follow* Aristotle, *as that we do not love him better than the Truth.* Galen *boasts of himself that he was alwaies of a free spirit, and preferred Truth before the Doctrine of* Hippocrates, Plato, Aristotle, *and the wits of other Men. And are we all born Servants and Slaves to other Mens opinions? 'Tis excellently spoke by* Seneca: They have done many things who are gone before us, but they have not done all. There remains yet much work behind, and much wil remain; nor shal any man born a thousand Ages since want occasion to add somwhat. *And above all things this shall be my endeavor, that all my Discourses of Natural Philosophy may tend to the honor and Glory of the most good and great God. Concerning whom I am admonished by St.* Paul, Rom. 2. *verse* 20. His invisible things are seen by the Creation of the World, being understood by the things which are made, viz. his Eternal Power and God-head, to the end they might be without excuse. And *Mercurius Trismegistus*: Man is made a Spectator of the works of God, and he hath wondred at them and acknowledged the Creator. *And again in his Book* da Pietate & Philosophia: there

can be no more true Godlineſs than to Underſtand the things that are, and glorifie the Creator for them: *and preſently after*; Be Godly O Son; he that is Godly is a Philoſopher in the higheſt degree. For it is impoſſible to be eminently Godly without Philoſophy. But he that learns what things there are in the World, how diſpoſed and by whom, and for whoſe ſake, he wil give thanks to the Work-Maſter as to a good Father, tender Nurſe, and faithful Steward: and he that gives thanks is Godly. And he that is Godly wil know where the Truth is, and what it is; and the more he knows the more Godly he wil be; *viz. With ſuch a kind of Godlineſs as may be attained from the Principles of Natural Philoſophy, Theoretical and Practical. For who can chooſe but be Godly who truly diſcerns the immenſe Omnipotency, Goodneſs, and Wiſdom of God? For he is (as* Auſtin *ſaies) without place, and in every place; inviſible, and beholding all things; immutable and changing all things; alwaies working, and evermore quiet; he fills all things and is not ſhut up; minds all things, and is not troubled; is great without quantity, and therefore infinite; good without quality, and therefore good in the higheſt degree.*

THE FIRST DISCOURSE.

Of the Principles of Natural Things.

Chap. 1. *That it is neceſſary for a Natural Philoſopher to know the Creation of the World.*

Two manner of Principles of Natural things.

HE that would treat of Natural Things muſt make it his chiefeſt care to handle the Principles of Nature; the Doctrine whereof being not rightly laid down, al things built thereupon muſt needs fal to ground. Now two kinds of Principles of Natural things muſt neceſſarily be conſidered and underſtood, *viz.* Thoſe of their Original and firſt Creation, and thoſe of their duration or continuance. The firſt kind of Principles muſt by any means be diligently conſidered, and he that enquires into the firſt Principles muſt neceſſarily enquire into God himſelf. For he is the Firſt of all, and the Principle of al other Principles, having created al things Natural, and preſerving them when created; ſo that they retain to this very day that Eſſence which he gave them at their firſt Creation. And herein chiefly moſt of al the Heathen Philoſophers are deficient or very barren, and no mention at al (or but on the by) of God the firſt Author of Nature; and they ſo deſcribe the whol Courſe of Nature as if al were performed without a firſt Cauſe, only by the action of ſecond Cauſes, and indeed contrary Principles. *Socrates* raiſed his mind a little higher, when a little before his death, as *Plato* relates in his *Phædo*, having heard out of a certain Book of *Anaxagoras*, that there was a certain Mind which diſpoſes and rules al things, and is the Cauſe of all; he ſaid he was much delighted with this Cauſe; adding moreover, that thoſe men exceedingly erred who reſted in the ſecond Cauſes and neglected the firſt. And he cals the Mind, or God, the Cauſe indeed; as without which the other Cauſes termed ſecond Cauſes, are no Cauſes.

The Natural Philoſopher muſt know God to be the firſt Principle of all things:

the ſecond Cauſes:

As to what concerns theſe ſecond Cauſes, or the Continuation and Conſervation of things created; ſince ſome Natural Things keep their Eſſence entire, ſuch as they were created at the beginning of the World without any mutation; but other things are preſerved only in their

their kinds, their particulars being subject to continual Corruption and Generation; we must also consider the latter kind of Principles, viz. The Principles of corruption and Generation.

As to the first kind of Principle, since al things (as al in their Wits grant) are governed by the Providence of God alone; they must also of necessity depend on him as their efficient; and seeing before any Natural things were made, there could be nothing but the most good and great God, we must needs hold that he is the first Author of all Natural things; who, when there was nothing besides himself, and there was no matter for him to work upon, by his Infinite Goodness, Wisdom, and Power, he commanded those things that were not, to be made. Which thing also the more sound Philosophers granted after their manner, although they did not cleerly enough explain the matter it self. Not to speak of others, *Plato* truly approved of the Original of the World, although he with-held his assent from some things concerning the same. For he constantly affirms, That the World did not proceed from Nature, nor from Fortune, nor was made by Hap-hazard, but that it flowed from the Wil of God, not bound by any necessity. But whether from Eternity a certain Matter did proceed from God, and was al at once formed into this variety of things, or being at first unformed, after an infinite tract of Time, he did adorn it with so many Forms, or, which is the only thing that remains, he performed both in Time, he neither saies nor denies, and reasons in such a manner of the Original of the World, that which way soever you turn and wind al that Disputation which he makes thereof in his *Timæus*, it wil seem to favor al these Opinions. Which also may be said of the Opinions of other Philosophers before *Plato*. And hence it came to pass that the Philosophers which came after *Plato* were of sundry Opinions hereabout. *Aristotle* truly, though he acknowledg God to be the Maker of the World, when in the 2. *de Generat. & Corrupt. cap.* 10. *text.* 19. he writes; *God hath filled the Universe:* and in the 30. Section of his Problems, the 5. Problem; *God hath given us two Instruments in our selves, by help of which we might make use of external Instruments:* yet he endeavors confidently and openly by divers Reasons to deny, That God made the World new and in time; and to overthrow the Opinions of the Ancients touching the Original of the World. And therefore though he acknowledg God the Author of the World, yet herein learned men conceive he contradicts himself, since Eternity is a duration proper to God alone, nor can a Creature be co-eternal with the Creator; nor can there be two Infinites, nor wil right Reason allow us to make the World equal to God. And hence a grievous controversie hath been raised amongst the Peripateticks concerning the mind of *Aristotle* in this point, nor have they as yet wel decided the Controversie. For there are two things principally which al Philosophers in a manner cannot understand, viz. How the World could be made of nothing, and how it could be made in time; for when they saw other Artificers make their Works by mixing some things, and taking away other things; they imagined that God also had thus made the World. And therefore though they granted God to be the Author of the World; yet they held there were before the Original of the World certain bodies, either floating up and down in the immense Space, or lying hid in a certain confused Chaos and Medley. But they were both ignorant who made those bodies: and if they grant God to be infinite, they might believe he could produce somthing even of nothing; especially since there was nothing before any matter imaginable, but he.

The World created by God:

The World created of nothing

Another thing which offends them is, That they think it absurd that God should be so long a time idle before the Worlds Creation, and at last set himself upon a new work. But since in Eternity there is neither fore nor after, it could not be made before it was made, unless it should be made from Eternity. But to be made, and to be made from Eternity imply a contradiction. And if you ask why the World was made five thousand years ago, and not twenty thousand years ago? I ask again, Supposing it was created twenty thousand years ago, why not an hundred thousand years ago? and if an hundred thousand years ago, why not an hundred thousand thousand years, and so stil forwards, unless it had been made from Eternity, which cannot be? For Eternity is a point wherein there is no going before or coming after. But the Philosophers could not by the reasons meerly of Nature and their own understandings, come to know the power of the most good and great God, who acts above the powers of Nature. But we may know these things very wel out of the holy Scriptures, the use whereof is by the goodness of God afforded unto us; and therefore those things in which the Philosophers are defective must be supplied from them. For though the holy Scriptures are not written to interpret the things of Nature: yet inasmuch as those things which are written by *Moses* touching the Creation of the World, were dictated by Inspiration of the holy Ghost; we must needs think that al those things which we read in the History of the

the World was made in time:

the use of the holy Scriptures in natural Philosophy

the Creation are most true: and that it is impious to suppose any thing there said to swerve an hairs breadth from the Truth. And suppose (which I do not now dispute) that every where in holy Scripture we meet with some things which are spoke according to the Opinion of Men, and either Tropically or otherwise Figuratively according to the Capacity of the common people: yet that cannot any waies be said of the Creation of the World, because God would have that made known to Men only as it is comprehended in this Writing of *Moses*, even to the end of the World. And although the primary scope of the holy Scripture is to propound the means to eternal Salvation: yet the History of the Creation of the World is not to be excluded from those means, as the Apostle teaches in the *Romans*, chap. 1. verse 20. seeing withal there are therein such Revelations of Natural things, as to which no sharpness of Humane Wit could ever be able to attain. An Example whereof the Creation of the World, and *Aristotle* himself, do afford. For let us suppose as *Julius Cæsar Scaliger* conceits, that Nature hath in *Aristotle* made ostentation of al the Wit Humane Kind is capable of; yet he could never attain to know the Creation of the World, as the most learned Peripatetick confess. And therefore to depart from the evident sence of Scripture and to assent to Pagans, is neither Lawful nor Godly. And although it be indifferent as to Eternal Life, what Opinion any Man holds in the things of Nature, and in this darkness of the minds of mortal men it can be no prejudice to a mans attainment of Eternal Life, if out of weakness of Understanding he err in this point: yet if any man does wittingly contradict the holy Scriptures, and esteems the Authority of an Heathen more than the holy Writ, I conceive that questionless he sins very grievously. Truly *Galen* cannot (nor ought he by any Christian Philosopher or Physitian) be excused who in his second Book of the difference of Pulses, chap. 4. carps at the School of *Moses* and of Christ, as delivering Laws not founded upon any Demonstration. And in his Book 11. *de usu partium*, where he disputes of the Hairs of the Eye-brows, he derides *Moses*, as if God the Creator had commanded these Hairs alone to keep alwaies an even size, and that they as fearing the power of the prescriber, or reverencing God himself that gave them that command, or being perswaded that it was best to do thus, they did as they were commanded. And afterwards he reprehends *Moses* for supposing that God could make all things, although he would make an Horse or an Ox of ashes; and he holds and determines that God himself never undertakes any thing which Nature cannot effect, and affirms that the Hairs of the Eyelids would not have been such as they are if they had sprung out of the soft skin, though God should have willed and commanded the same a thousand times. Well therefore did that same famous Philosopher and Physitian *Franciscus Vallesius*, who in the Proeme of his Book *de sacra Philosophia*, is not ashamed ingenuously to confess, That when he was a yong man he wrote Matters Philosophical (viz. When he commented upon the Physicks of *Aristotle*) according to Opinion (that is the Mind of *Aristotle* and his Interpreters) but that he writes these things according to the Truth, that is to say, agreeable to the History of the Creation in holy Scripture, seeing before he could have no certainty concerning the Principles of Natural things before he knew them by reading the holy Scripture, to the reading whereof he had consecrated his old Age. And I have been long of the mind, That he who not knowing, or neglecting the Creation of the World, shal undertake a Dispute of the things of Nature, he shal err in many things; yea, and that many upon that occasion have fallen into most grievous Errors.

Things to be observed in the explication of the History of the World

Now *Moses* hath described the History of the Creation in the first Chapter of *Genesis*; the Interpretation whereof to set down in this place, I count not worth the while; since there are many large Commentaries extant thereupon, and amongst the rest that of *Franciscus Vallesius*, which though it be short is none of the worst. Only I shal advise you of one thing; That there are many who affix a wrong Interpretation upon the Text of *Moses*, whiles they endeavor to expound *Moses*, not by *Moses*, but from the Writings of Heathen, an unhappy and intollerable design. For it is certain amongst al Christians, that al things delivered in the holy Scriptures are true, and those delivered by *Moses* (being plainly Historical) are to be understood according to the proper and genuine sense of the words, as they are commonly understood in the Holy Scriptures; and not to be explained according to pre-conceived Opinions sucked in by reading Heathenish Authors: nor is the holy Scripture to be wrested to such Opinions. And therefore *Augustine* gives a good warning in the beginning of his second Book upon *Genesis*, that we take heed lest we contend, not for the sence of the holy Scripture, but for our own Opinion, so that we would make that to be the Opinion of the Scripture which is our Opinion; whereas we should rather be willing to make that our Opinion which is found to be the sence of the Scripture. The History (truly)

of

of the Creation is not repugnant to Nature, but it is many times oppoſite to the falſe Conceptions which Men have of Nature; concerning which the ſame *Auguſtine* in his ſeventh Epiſtle to *Marcellus* thus writes: If a reaſon be given contrary to the Authority of the holy Scriptures, be it never ſo acute, yet does it deceive by an appearance or ſimilitude of Truth. For it cannot be true. Again, if a man does oppoſe the Authority (as it were) of the holy Scriptures againſt moſt manifeſt and certain Reaſon, he that does ſo underſtands not himſelf, and he does not object the ſence of thoſe Scriptures which he cannot dive into, but his own ſence againſt the Truth; nor does he oppoſe what is in them, but what he finds in himſelf in their ſtead as it were. And therefore although it ſeems hard to many to abandon ſome Hypotheſes of Natural Philoſophers, becauſe they agree not with the Hiſtory of the Creation of the World: yet is it altogether neceſſary ſo to do, ſeeing there are ſome things in *Ariſtotle* contrary to the Hiſtory of the Creation of the World. For as *Benedictus Pererius* (an excellent Ariſtotelean) hath ingenuouſly written, *de Com. Rerum Nat. princip. Lib. 5 cap. 7.* nothing can be found out or imagined which is more contrary to the Doctrine of *Ariſtotle*, and which does more vehemently break al his Joynts and Nerves, than the Creation of the World. And a little before; When the Peripateticks perceived that a Creation being allowed, moſt grievous inconveniences would follow againſt their matter, they could by no means be induced to grant the ſame. And he who wil examine ſome Teners of *Ariſtotle* ſhal eaſily perceive that *Pererius* was not miſtaken when he ſo thought and wrote. And he ſhal ſee the ſame (not to ſpeak now of the Eternity of Motion, and of the World) who wil but conſider the Doctrine of *Ariſtotle* concerning the Principles of things Natural. But it is not my purpoſe to produce al the Teners of *Ariſtotle* which may be called into queſtion, nor is it my deſign to ſubvert the Natural Philoſophy of *Ariſtotle*, but rather to ſhew which way the ſame may be perfected. And therefore I ſhal only hint a few things concerning the ſame.

Chap. 2. *Whether the Principles of Natural things are contrary.*

Whether the Principles are contrary?

ARiſtotle in the firſt of his Phyſicks, chap. 6. preſuppoſes this as a thing granted by all Men, That the Principles of Natural things ought to be contraries. Now he was perſwaded to hold this Opinion, either becauſe he beleeved that the generation of al Natural things was performed by the action of Contraries, and that when one contrary overcomes another, this thing periſhes, and another is generated; or becauſe he would inſiſt in that Method by him pointed out in *Lib. 1. Phyſicor.* and proceed from things moſt known to us, to ſearch out the Natures of things. But ſome Expoſitors of *Ariſtotle* have long ſince told us that this propoſition is not univerſal, nor hath place in al Phyſical things. For ſince the World hath two ſorts of Parts, ſome that have remained incorruptible and unchangable to this very day, viz. The Heaven and the Stars; ſome corruptible, whoſe Individuals are generated and corrupted, yet the kind is preſerved by a continual ſucceſſion of the ſaid Individuals; it eaſily appears, how thoſe principles belong to the Heaven and Stars. As for Matter, it belongs indeed to the Heaven, but not by a definite contrariety, but only affording Magnitude. For (which *Ariſtotle* wil not deny) the end of matter is to be the Receptacle of Forms, both ſubſtantial and accidental; and therefore in 2. *Phyſ. cap.* 8. *text.* 81. he terms the Form the End of the Matter; and the ſame Matter gives corpulency and an indeterminate magnitude to things, and hath an aptitude to receive Forms, and a determinate figure, and of it ſelf is no waies the Cauſe of Generation and corruption, but receives thoſe effects from ſome Agent, or as *Scaliger* writes in *Exercitat. 61. Sect. 1. Matter was not given primarily and of it ſelf, for to cauſe a tranſmutation to generation; ſo that where ever it is, there alſo Generation ſhould be; but to be the ſubject of the form of Corporiety in a ſubſtance, and to receive Quantity and Figure: Quantity in regard of change of place; Figure, becauſe every body muſt and ought to be finite.* And a little after, *For theſe Cauſes Matter (by a primary Councel of God) was created; but ſecondarily, and as to a leſs noble end, for Generation.* And therefore although Matter belongs to al Natural things; yet, that the Principles of Natural things ſhould be contrary does not belong to al; ſince in the Heavens and Stars (according to the Opinion of *Ariſtotle* himſelf) there is no Generation, and no contrariety, which might be the cauſe of Generation and Corruption. And therefore Principles with a definite and determinate Contrariety are not the moſt general, but do belong only to bodies ſubject to Generation and Corruption.

the End and uſe of Matter.

Moreover,

Moreover, they do not belong to al corruptible and mutable things neither, but to such alone as are made by the action of contraries, and not to such as are made of seed. And touching this very Contrariety of Principles, and concerning them how they are contrary, the Peripateticks themselves are at great variance; of which see their Commentaries. Howbeit, the most of them do not place a true Contrariety in the first Principles, but such an opposition as is between the Habit and Privation, as *Zabarella* writes in his first Book *de materia prima, cap.* 2. and thus of an Egg which is no Chick, a Chick; and of Wood which is no Statue, a Statue; and of Potters Clay a Pot they say is made, and that Generation is a passage from a Privative to a Positive Essence.

But in good deed, thus going to work they have not sufficiently explained the Doctrine of the Generation of things, nor have they sufficiently laid down the Causes of Generation. For in the first place those examples which they bring of Artificial things, as when a stool or statue is made of Wood, a Pot of Potters Clay, a Globe of Wax, and such like, are all to be rejected: seeing they are not produced by operation Natural, but are the works of Art. Moreover, although we should admit a Contrariety in things Natural, in regard of their forms, by which many actions and Sympathies and Antipathies are caused, as Water is contrary to Fire, and Plants are killed by the Cold; yet from that very Contrariety a Cause of the Generation of al things cannot be rendred, nor is that Generation which is primarily intended, accomplished by the Action of Contraries; and therefore it cannot be granted that contrary Principles must be constituted for every Generation. For that a Sheep produces a Sheep, a Plum produces a Plum, does not proceed from the Action of Contraries.

And therefore although the Expositors of *Aristotle* having canvassed the matter to and fro concerning the Contrariety of Principles, do at last conclude, That one Contrary is not made of another, as of the term from whence, but that one Contrary is made after another; as for example, Cold after Hot; yet that term infers no causality, and affords nothing to the production of the thing, and therefore cannot be called a contrary Principle.

Chap. 3. *Of the Form.*

the Form the principal Cause of Generation.

And therefore besides the Matter, our great Care must be to find out a Principle which is the efficient Cause and principal Agent in the Generation of al things. Verily (that I may not seem injurious to *Aristotle*) I must needs confess, that he in *Lib.* 4. *de Ort. & Interit. cap.* 9. *text.* 53. *&c.* as also in the end of the 4. of *Meteors*, reprehends the Ancients, because they did teach the Generation of things to be caused by the first Qualities, too instrumentally, omitting the Cause taken from the Form, and doing just as if a man should attribute to the Saw, Hatchet, and such like Instruments, the things made by them. But I could wish that in the beginning of his Physicks he had made larger mention of that Cause, or at least that his Expositors had from other places of his Works explained what *Aristotle* taught in his Acroamaticks concerning the Principles of Natural things. For so doubtless they would have enquired thereinto, and would not have been so content with the action of contrary Principles, and taught that the Generations of things were so instrumentally performed by them. Yea, and it were to be wished that *Aristotle* himself had been more sollicitous about that Cause, or had more largely explained the same, and not extended too far the action of the first Qualities. At the end indeed of the 4. of his Meteors he plainly laies open his mind; where he attributes the Generation of similar parts in Animals to the action of the first Qualities, but the Generation of the dissimilar parts alone he attributes to a superior Agent, while he thus writes: Such parts happen to be made by Heat and Cold and their motions; being compacted by the power of Heat and Cold. Now I mean those parts which are similar, as Flesh, Bones, Hairs, Nerves, and al that are like to these. For they are al distinguished by those differences which we mentioned before, viz. Tension, Drawing, Comminution, Hardness, Softness, and others of the same kind. For such parts I say are made by heat and cold and mixt motions. But no man can imagine that the dissimilar parts, as the Head, or Hand, or Foot, are constituted of them: but as the motion of Cold and Heat is the Cause why Brass or Silver are made, but not of the making of a Saw, Glass-bottle, or Box; but of these Art, of the other Nature, or some other Cause: and so it will be thought to be the cause that those things are made. But whether this Doctrine of *Aristotle* be perfectly currant, I leave to the Reader to judg. *Galen* (truly) and other Physi-

tians,

rians ascribe not only the Formation of the dissimilar parts to the Soul; but also they attribute thereto a blood-making, flesh-making, bone-making, nerve-making Faculty; and doubtless they are therein in the right. And who can beleeve that Gold, Silver, Iron, are generated principally and solely by Heat and Cold; and that the efficiency of the Form is not added. Moreover, neither hath he sufficiently declared what that specifick cause is in the Generation of things, but neglecting the same he often runs to the Universal Cause. For in his Book *de Generat. & Corrup. cap.* 10. and the following Chapters, he makes no mention thereof, but after he hath rejected the Opinions of the Ancients, and would produce his own, he flies to the Motion of the Heaven; and after he hath taught that the Motion of Heaven is perpetual, thence he concludes by way of Consequence, That rather that which is should be the Cause of that which is not, than that which is not the Cause of that which is; and that that which alwaies is, should make and produce that which is not and is generated. But at the beginning of the World, neither did the motion of Heaven make things Sublunary, nor now being only an universal Cause does it produce the sorts of things. For God in the first Creation gave to things their Forms, by which the Order of Generation is continued and perfected; and these Forms are justly held to be the Agent Principle, and as the Expositors of *Aristotle* themselves do hold, have a power to multiply themselves; and all the Generation of Natural things depends upon the multiplication and propagation of Souls, by reason of the Faculty which by the Almighty power of God was put into them at the first Creation, when God said, *Gen.* 1. 11. *Let the Earth bring forth Grass, the Herb yielding seed, and the Fruit-tree yielding Fruit after his kind, whose seed is in it self upon the Earth: and it was so. And the Earth brought forth Grass, and the Herb yielding seed after his kind, and the Tree yielding Fruit, whose seed was in it self, after its kind.* And in verse 22. he said to the Fishes and Birds; *Encrease and multiply, and fill the Waters in the Seas, and let Fowl multiply in the Earth. And God made the Beast of the Earth after his kind, and every thing that creepeth on the Earth after his kind: and God saw that it was good.* And to Man-kind he said, verse 28. *Encrease and multiply, and fill the Earth.* Also in verse 29. *Behold I have given you every Herb bearing seed, which is upon the face of all the Earth, and every Tree in which is the fruit of a Tree yielding seed.* But as to the manner of Generation; The generation of Plants and Animals does sufficiently declare, that their Generation is not caused by the action of contraries one upon another, but by the communication of Souls, or by Seed which perfects the Fabrick of its own body, not primarily by the action of contraries, but by attraction of things friendly and of kin, and the expulsion of things having Enmity. For, that the body of some Plant or Animal is made, does not come to pass by the only concourse and fighting of the Elements. For except, as *J. Cæsar Scaliger*, in *Exercit.* 307. *Sect.* 20. rightly teaches, *Those four Elements have a Governor, they will both toss and be tossed rashly without manner or measure. For what is that which mixes just so much Earth, and so much of the other Elements? But there ought to be in every motion one first mover. For they cannot move themselves to the Production of any work; but in Compounds they are moved by the more excellent Form to Generation, and in imperfect mixt Bodies by an external Principle they are moved to a mutual connexion.* For instance, when the Seeds of Plants are cast into the ground, the Elements do not then begin to fight that they may make the Body of a Plant, but each particular seed draws out of the Earth such nourishment as is to its own Nature agreeable, some that which is harsh, others that which is bitter, sweet, salt, as *Hippocrates* writes in his Book *de Natura Humana*: whence the whol Plant is formed, nourished, and attains to its growth.

The first Original of Forms.

Yea, and even *Aristotle* himself when he treats of Generation, cannot rest in the first Qualities, but is compelled to ad an higher Agent, viz. The Soul, even in the Generation of the similar parts, whiles in 2. *de Generat. Animal. cap.* 1. he writes: *Even as we do not say that an Hatchet or other Instrument is made by the fire alone: So neither the Foot nor the Hand, no nor so much as the Flesh. For it also hath some office. Hardness therefore and softness, clamminess, stiffness, and whatever other dispositions are in the parts animated, may be produced by heat and coldness: but that whereby it is Flesh or a Bone cannot: but it is so made by a motion proceeding from the Generator, which is actually that thing, which the thing whereof Generation is made is potentially or by way of aptitude; as we see it is also in things Artificial. For Iron is made hard or soft by cold or heat; but a Sword is made by the motion of Artificial Instruments, which motion hath in it the Nature of the Art. For Art is the Principle and Form of that which is effected, but in another. But the motion of Nature is in it self, proceeding from another Nature,*

The first Qualities are only an instrumental Agent in Generation.

which hath the Form actually. And as was said but even now, in 2. *de Generat. & Corrupt. cap.* 9. *text.* 53, 54, 55. he reckons Heat, Cold, and such like Qualities for Instruments, and saies they generate *after a very Instrumental manner*; and he writes that such as attribute Generation to them, do just as if a man should make a Saw, Ax, or any other Instrument the Cause of all those things made thereby.

Whence the Elements have their forms.

And just so it is with the Elements. For when God first created the Heaven and the Earth, he first separated the Elements, and distinguished the Earth from the Water, and so gave the Elements their forms. That therefore is false which *Zabarella* endeavors to teach out of *Aristotle Lib.* 1. *de Element. cap.* 8. 9. (where he pitifully beats his Brains and vexes himself, and yet cannot make it appear how the first Qualities which flow from their forms can be before them; nor doth he seek after Truth in the thing it self, but how he may find such an Opinion as the words of *Aristotle* can bear) that this Elementary world hath nothing of it self but Aptitude or Potentiality; and whatever it hath of act, it receives from the Heavens; and that the whol matter of this inferior world is potentially Hot, Cold, Moist, Dry; but is actually made such by Immobility the motion and of the Heavens; growing hot by the motion of Heaven, and cold by the want of that motion; and that after the first Qualities (which are the preparations for the eduction of Forms) the forms of the Elements do follow, and that so the Elements are made and continue such (according to the Opinion of *Aristotle*) from Eternity. The holy Scriptures, as hath been said, do teach us better that the Elements were created at the Beginning, and that all things have their matter and forms whereby they differ one from another, and whereby they are able to operate, from the first Creation, and preserve the same to this very day, by the good wil and pleasure of the good and great God.

Whether Forms are drawn out of the aptitude of the Matter?

From all which it appears, that God in the first Creation gave to all natural Bodies their matter and Form. To which if some would afford their Consideration, they would think otherwise than they do concerning the original of Forms. For it is an opinion sufficiently common, for which some plead as if their Life and Salvation lay on it, that forms are drawn out of the power or aptitude of the Matter, which is nevertheless built upon no sure Reasons, as I have shewed *in my Epitomy of Natural Philosophy, Book* 1. *Chap.* 3. and as I shal shew hereafter in *my Fourth Discourse touching the Original of living things*, chap. 4. Here I shal add nothing, but that this Opinion had its original from the Ignorance of the Creation of the world. For since they knew not whence all natural things should receive their forms, and that they had by command of the Creator a power to multiply themselves; they invented this original of them. Most indeed do give this out for an Aristotelick tenet, but with *Bon-Amicus* and others, Dr. *Casper Hofmannus*, a man excellently vers'd in *Aristotle*, saies it is a tenet of *Averrhoes*, in *Tract. de Origine Form. neer the end.* Yet the said *Hofmannus* in the same place doth produce some texts out of *Averrhoes*, wherein he holds the efficient cause of Generation to be the form contained in the Seed: so that the foresaid Tenet seems rather to have had its original from the Schoolmen. *Aristotle* is verily of another mind in this point, who though he admits the Heaven as an universal Cause, yet he adds an immediate Cause, when he writes, that the Sun and Man generate a man. And in 2. *Phys. cap.* 3. *text* 31. he hath these words expresly concerning Seed: *The Seed and the Physitian, and the Consulter, and whatever, is Efficient, all these are the Causes whence the Beginning of Mutation, of Rest and Motion doth proceed.* And *Scaliger* produces more such Places in *Exercit.* 6. *sect.* 2. of which also mention is made hereafter, where we shal speak *of the Generation of Living things.*

Whence that Opinion arose, of drawing Forms out of the aptitude of the Matter.

Now two things chiefly brought the School-men into this Opinion: the first it that they beleeved, as was said before from *Zabarella, Lib.* 1. *de Element. Qualitat. cap.* 9. and as they indeed suppose, according to the mind of *Aristotle, Lib.* 1. *Meteor. cap.* 4. that this Elementary world hath nothing of it self but aptitude or potentiality; and that whatever it hath of act, it receives from Heaven; and if at any time all the Elements were at first generated, and began to be what they are, they were generated by the Heavens; and because according to *Aristotle* Generation never began, that they are perpetually made and preserved such by the Heavens.

The other is because they endeavored to prove their natural Principles by examples drawn from the production of things natural (which kind of Examples though *Aristotle* hath used in his Physicks and Metaphysicks, yet we must think he intends thereby only to illustrate, not to prove that Doctrine:) for when they saw a Statue or Image made by the Carvers paring some what off, and adding if need were somwhat, and that when the Artificer had done his work at last, the very moment he leaves off the Form results from

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al that hath been done: they thought after the same manner, that by the action of some external Agent (yet what that Agent should be they have not clearly enough explained, lurking under the general term of Nature, whereas a specifick cause ought to be rendred of every specifick Effect) some disposition was brought into the matter, upon the final perfection whereof the form sprung up in a moment: and they said that it was drawn out of the power or aptitude of the matter. But they were herein in a very great Error: For when of Wood a Bench is made, or a Statue; or a Jug is made of Earth, a Globe of Wax, there is nothing induced but a certain Accident, Quality or Shape, and there is then no power of the matter save obediential. But here the Question is concerning the original of a Substance. Yet the Production of even artificial things might have brought them to the knowledg of the generation of natural things if they would have weighed the matter more accurately. For as artificial things are produced by an actual Agent, according to a determinate Idea in the mind of the Artificer, and so every thing is not made by every Artist, but a Carver makes one kind of work, a Box-maker makes another kind: a Carpenter makes another: so also to the generation of every natural thing a determinate and specificial Agent is requisite, and one that is an Agent actually which according to the Power given it by its Creator (as the Artist works according to the Idea or Pattern in his mind) makes a work like it self. Herein only is the difference, that the Artist in the artificial generation is without the matter: but in things natural, the Artist is in the matter, and diffused through the matter as *Galen* speaks, *de Causis procat. & Causis pulsuum.* Nor can any external thing, whatever they shal feign, be admitted for a determinate cause, since none is like unto and (as they say) univocal to the thing generated, or hath at least that similitude to the thing generated which the Pattern in the mind of the Artist hath to his work, be it Statue, Pot, Bench, or what ever. For indeed Nature is an intrinsecal Art; Art an extrinsecal Nature. Now Nature hath this Art from God, the foot-steps and Prints of whose wisdom appear every where, in Men, in Bees, in Pismites, in the leaves and flowers of Trees, and al natural things whatsoever upon which the Creator hath imprinted his Image when he gave them Forms. For every Form is a participation and Image (after its manner) of the Power, and Wisdom, and Goodness, and Love of God: and every Being or thing, by its form, hath a desire to be, a Knowledg how to be, and a Power to be. And all things natural have by their forms whatever they have, and from the form proceeds the whol Fabrick of the Body, and the ornament of Accidents; and many Qualities which are vulgarly ill attributed to the mixture of the Elements and the temper of tangible Qualities do flow from the Form, and all the furniture of the Body proceeds from the Form, as I shal hereafter shew more at large in the 4. and 6. Discourses of this work.

The difference betwixt Artificial and natural Effects.

And although in the Forms of things we meet with many Particulars worthy of admiration: yet forms have chiefly three Proprieties which are diligently to be observed: The first is, that the Form of it self hath no Quantity, nor can it be divided; and the same can be as essentially entire and compleat in a smal Quantity, as in a great Bulk; and in the smallest Atome or indivisible Particle of Fire, or Water, is as perfect as in a great Quantity of either; and in a smal Seed of Poppy or Tobacco, as in a great Plant of either; or to avoid all occasion of cavilling, in a little Sprig sprouting from an Acorn set in the Ground, the form of an Oak is as perfect and compleat as in the tall and hard Oak afterwards: nor is the Soul which is in a small Seed or Shoot, lesser than that which is afterwards in a tall Tree: nor is that in an high Tree greater than that in a smal Seed or Branch.

The Proprieties of Forms.

Secondly, Yet is the form extended according to the extension of the Matter, or rather the form fils its whol Matter: For whereas, that I may demonstrate this by the Example of Plants, the whol Body of the Plant lives, is nourished, grows; the soul which was at first in a smal Twig, diffuses it self (its nature becoming no bigger) into the nourishment newly adjoyned; and where ever the Body is which lives, there the Soul is rightly said to be; and the plenitude (if I may so speak) or Replency of the Soul is just so great as the living body, and the dimensions thereof. For since no act is performed without some primary Agent; where ever there is nutrition, there of necessity the Soul must be. And because Augmentation is made, when the pre-existent Soul communicates it self to the affluent Aliment, whose Bulk reaches further than the Body which is nourished, and diffuses or sheds it self abroad thereinto; of necessity it must be present in every part of the whol Body. After the same manner the case stands in Animals. For since they are nourished, encreased, and endued with the guift of feeling; the soul which is but one, must of necessity be in all parts of the Body.

Thirdly, But although every form be of it self uncapable of being divided or parted, yet because it is coextended or stretched out together with a corporeal body, which hath Quantity, by the division thereof it becomes capable of number, and is multiplied into many Individuals, and every form hath the Power of self-multiplication. Howbeit the manner of that multiplication is not one and the same. In some Plants in which the seminal matter is dispersed through their whol Bodies, the soul though of it self not subject to Quantity, is divided after a manner peculiar to it self according to the division of the Matter, and being actually but one in number is manifold potentially, that it hath in it a fitness, power, or aptitude to become many and becomes actually manifold, when its Body is divided into many parts; of one Vine many Vines, and of one Willow or Withy many may be made. But in others this same Multiplication is caused by Seed: of which we shal speak more at large in our Discourse *of the Generation of living Things.*

Chap. 4. *Of Privation.*

Privation. I must here also ad somwhat concerning Privation, which is reckoned amongst the Principles of natural things. Since the original of the form is such, as hath been explained just now, and shal be hereafter explained more at large; Privation unless the nature thereof be rightly opened, is in vain reckoned amongst the Principles of things natural. The very Expositors (truly) of *Aristotle* themselves do grant, that Privation is not a Principle, otherwise than by accident, if you regard the thing it self constituted: but if you consider the Generation thereof, it is of it self a Principle, viz. because it is as a Term from which, (since it is the absence of the form in the immediate Matter) which hath an aptitude to receive the same: Which opinions if they are to be allowed, they do stand altogether in need of a convenient explication. For that which is wont commonly to be said, that Privation though it belong not of it self to the Essence of things to be generated, yet it concurs of it self to natural Mutations, and from it all natural Generation proceeds, so that the form doth (as it were) arise thereout; that is false. The absence of the form helps nothing to the Generation; but besides the matter a disposition to receive the form is necessary. For every Form and Soul, since from the divine Benediction it hath a faculty to multiply it self, it requires a matter wherein to be propagated, and it disposes and fits the same for it self. Plants (for example sake) produce Seeds or bulbous roots, and Eg-engendring Creatures produce Eggs, other living Creatures produce seed, by which they are able to multiply themselves and to communicate somwhat of their Essence. If they please to term this disposition Privation, they shal have my consent. But they do not cleerly enough explain how the Form follows Privation, and whence it proceeds. The Conimbricensian Collegiates do say indeed, *Lib. 1. Phys. cap. 9. Quest. 9. art. 2.* that the matter then only attains an immediate and compleat aptitude, when it is arrived to the Term and Fulness of all the Accidents wherewith it is disposed and fitted by the Agent, which term betides only in the very moment it self of Generation. And very true (indeed) it is, that disposition of the matter whereby it is fit for the multiplcation of the form is made in time, and at last perfected in a moment, nor can the Seed of a Pear or an Apple be termed properly a Seed, til the accomplishment of the accidents is presenr. But the Form is not absent while these previous dispositions are made, so as to result upon their accomplishment; but it is already present, and it self according to the nature of the Body whereof it is a form, fits the matter wherein it may multiply it self, and elaborates the same, and in this elaboration some space of time is spent, more or less according to the Nobleness or Baseness of the Forms: but when it hath introduced the utmost perfection and accomplishment into the matter, just then the Form which before had a power to multiply it self, doth multiply it self actually; as for example sake, in a Poppy look how many seeds are generated, so many times doth the form of the Poppy multiply it self, and so new Plants of Poppy are generated. The soul in an unripe seed is not different from that in the same seed when it is ripe; but herein lies the difference, that the seed unripe lives only with the soul of the Plant; and being separated from the Plant wherein it was bred it cannot exist of it self: but a perfect and ripe seed is so disposed, that though it may be separated from the Plant wherein it is produced, yet it hath the same soul in it self, and lives now by its own soul, so that it can exist by it self. Of which matter *J. Cæs. Scaliger* saies rightly, *Exercit. 6. sect. 10. A Tree* (saith he) *engenders, when it produceth seed. But the Tree is not then generated when it sprouts out of the seed; but then that which was formerly ingen-*

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dred and imperfect, is perfected. But if any man wil thus explain the vulgar Doctrine of Privation, and say that after the matter hath received al its accomplishment of Accidents, then there is a Privation, and that then afterwards in a moment the Form is introduced by an external Agent, that man is very much out, as shal hereafter be largely declared in its place; and it is sufficiently proved by *Julius Cæsar Scaliger, Exercit. 6. Sect. 5.*

The Nature of Privation explained.

To be brief: In the first place, Privation (however it be explained) does not belong to al Natural things, but to such alone in which there is Generation, and therefore it cannot be numbred amongst the most general Principles of Natural things. For in the Heavens there is no Privation properly so called. For since it supposes a subject having aptitude to another Form, there is no such aptitude in Heaven.

Secondly, Privation (which also the Expositors of *Aristotle* themselves do teach, as may be seen in *Tolet. Lib. 1. Phys. cap. 9. Quest. 21.*) is not a Principle of Constitution, or which enters the thing generated, to help make it up, but of Generation.

Thirdly, Though it should be admitted for a Principle of Generation; yet they who maintain the Doctrine of the Eduction of Forms out of the aptitude of the matter, cannot conveniently shew what Privation is. But if we hold the multiplication and propagation of Forms, Privation may (not unfitly) be explained two manner of waies.

First of all, Since Forms are propagated not without Matter, but with it, and every Form requires a peculiar matter; that same last disposition to the reception and propagation of the Form may (not altogether unfitly) be called Privation: and it may be thus defined. Privation is the absence of a Form in a Matter which is immediately fitted to receive the same. To explain the thing by Examples: In a Stone there is no aptitude to receive the form of an Apple, or of a Dog; and therefore we do not say there is the Privation of the form of an Apple or a Dog. So neither is the Soul of a Dog propagated with his Blood, nor the form of an Apple with the pulp or meat thereof, but with the seed. And seeing the seed is not generated in a moment; for examples sake: The seed in an Apple is first white, and then it becomes black and ripe, and apt to receive the Soul of an Apple into it, and also to retain the same, being separated from the Tree: in the seed already ripe, and which hath already in it the soul of an Apple, Privation is not said to be because the Soul is already therein; but in that same seed which is just ready to ripen and is immediately fitted to receive the Soul, and to retain it, though it be separated from the Tree, Privation is said to be; and then Privation is that same ultimate disposition of the seed whereby it is fitted to receive and propagate the form of an Apple.

Secondly, Because nevertheless in that same ripe seed the Soul is present, at least in its first act, and because it wants Organs is not vulgarly called an Apple-tree, as an Egg is not called an Hen for the same Reason: If any man by reason of the absence of those Organs necessary to perform the actions of an Apple-tree or an Hen, shal cal that disposition which is in the animated seed and Egg, to receive the Organs, and exercise the actions by a second act, Privation; and hold that in the Eg there is the Privation of an Hen, because there is therein an immediate aptitude to become an Hen, consisting of a Soul and perfect Body, I wil not quarrel or contend with that man; provided he grant, that in such a Seed and Egg there is not simply a privation of the Soul, since it is there not the first act, but the Privation of a Soul furnished with bodily Organs necessary to perform its actions.

And truly, I see the most learned Aristoteleans when they perceive the Tenet of *Aristotle* cannot be otherwise explained or defended, they can find in their hearts to embrace this Opinion. It is one and the same thing they say, which *Aristotle* names Privation, and which also he names the Form, whose absence, after its manner, is Privation, viz. In a divers respect. *Scaliger, Exercit. 6. Sect. 5.* There is in the Seed the forming Soul, going before the Soul for which it prepares that House; or as *Zabarella*, in his B. *de facult. anim. cap. 11.* speaks, the animated seed is a certain Matter cut off by the Animal it self which ingenders, retaining an active power able to generate a like Animal. For the seed of a Man hath an implanted force in it, whereby (as *Aristotle* saies, 2. *Phys.*) the Humane Nature is not as it were a Form, but as an Artificer, or immediate Agent. And therefore (in the former respect) it is an internal Principle of the thing to be formed; and although it do not inform that compound which yet is not; yet it informs the Seed so as to give it the name of a Mans seed, a Dogs seed, an Horses seed, &c. And therefore *Aristotle* cals Privation the Form as it were 2 *Phys. cap. 1. t. 15.* in respect of the form considered after the latter manner, viz. of the Compound. Inasmuch therefore as it disposes the Matter, and is the Architect of the parts to be formed out of the seed, so far it is termed Privation. And it is in reality a substance, and it is only termed a *Non Ens*, or a Non-being, in respect of the Form which shal animate

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the parts generated out of the seed. For it hath not yet the Office of a form. So that passage in *Lib.* 2. *de Generat. animal. cap.* 1. is to be understood with a grain of Salt, where *Aristotle* tels us, that the Soul is potentially in the seed. For as the parts of the Body are not actually in the seed: so neither is the Soul in the Seed as a Form, so as to give Essence to the parts of the compound, which are to be framed out of the Seed. Mean while it is actually in the Seed, as a principle of acting, that the living thing may be generated, as *Aristotle* professedly discourses in the foresaid place. To which purpose also *Julius Cæsar Scaliger* in *Exercitat.* 6. *Sect.* 5. thus writes. *Concerning this matter we are thus to think: That the Form is in the seed of a Dog, in the aptitude whereof it is said to be; because the Seed is able to give that Form which it hath in it self. Now it is reduced out of that remote aptitude which is the first act, to a neer aptitude which is the second act,* viz. *That the Form may be in the same Matter after such a manner as to need no helps to enjoy its end for which the whol Compound is ordained. It must therefore be declared after what manner it is brought forth by preparation; in case the Form it self be author of that preparation. For the Form does both alter the whol, and order the parts for its own accommodation. The Form therefore should draw it self forth. Therefore they said not well; That when it shal attain the greatest perfection of preparation, then also it shal arrive to the substantial Form. For the Form it self exists before that: therefore it does not arrive to it, but to the act thereof, whereby it may afterward enjoy the use and benefit thereof.* After which manner if any man wil explain Privation, I willingly shal allow thereof. Yet this is certain, That the vulgar Doctrine of Eduction of Forms cannot stand with this Opinion.

Chap. 5. *Of the Consent and Dissent of things Natural.*

There is a Consent & Dissent of Natural things.

NOw as the Forms are the first Cause of al Actions; so in regard of their Forms there is a Consent and Dissent of al Natural Things, and some things have a friendly appetite one to another, and unite themselves; others are averse one to another, and fly one from another. *For things like do exceedingly covet Union. For that which is not one is not at all. So, that which is separated from its like seems also to defraud the same, and that it is defrauded thereby of the compleatness (as it were) of its Essence; for I do not say they are two fires, but one divided:* As *Scaliger* writes, *Exercit.* 310. *Sect.* 2. Seeing therefore every thing requires its own Conservation; it attains the same by shunning things contrary, by moving to things like, and by drawing like things unto it self. Hence Fire unites to Fire, but flies from Water; and Water unites to Water, but flies Fire. Hence Water sprinkled in the Air or on dust gathers it self into round drops like balls to defend it self from the Earth and Air. Hence a smal flame is most swiftly drawn to a greater, or a little flame does move it self to a greater. The same is done in the Air. Hence those Bubbles which are made on the Water do move one to another, and so much the faster by how much they are neerer. So (as *Pliny* writes, *Lib.* 2. *cap.* 105.) *Naphtha* is of great kin to Fire, and the Fire leaps to it if it come neer the same. So they report *Medea* burnt her Rival, her Garland taking Fire as she came to the Altar to Sacrifice. Hence we see that if Water be sprinkled into boyling Oyl or Tallow, or melted Lead or Antimony, the fire flies from the water as an Enemy, raises a flame and mounts aloft; so that somtimes water poured into boyling Oyl or Tallow, hath been the occasion of setting Houses on fire. And here *Hieronymus Fracastorius* is of a different mind, who in his Book *de Sympath. & Antipath. cap.* 5. denies that one thing is moved to another by reason of similitude, so that it may be united hereto and preserved; because the part separated can neither by knowledg, nor by Nature, be moved to its like part. And that it knows not, he thinks it a cleer case. But without Reason. For as there is a certain Natural Appetite which they commonly cal Instinct Natural: so there is a certain natural knowledg distinct from sense and understanding. For nothing can seek after any thing as pleasing, or flie it as displeasing, unless it have some natural knowledg of the gratefulness & fitness of the one, and the ungratefulness & unfitness of the other. For nothing is desired that is not first known. By this kind of knowledg Plants do know such Nutriment as is fit for them, desire and draw the same to them; and what is unconvenient for them they let alone; and that which they have drawn, they turn some of it into Bark, other some into Fruit, other some into other parts. Of which *Hippocrates, de Nat. humana, text.* 31. *Such things as grow and are sown, when they come into the Earth, every one draws that which in the Earth is most familiar thereto, as there is bitter, sweet, sowr,*

A Natural Appetite, & a Natural Knowledg.

sowr, and all kinds. So in the Crisis of Diseases, by a Natural Knowledg Nature knows and expels a vitious humor, and retains the good and profitable. By this Natural Knowledg Nature many times seeks strange and hidden waies to expel humors. And amongst the principles of the Nature of things *Galen* reckons this also from *Hippocrates*, 1. *de facult. nat. cap.* 12. That Nature performs al things artificially and justly, as being furnished with Faculties whereby al the smal particles do draw convenient juyce to themselves, and when it is drawn they make it grow and stick to every part, and at last assimilate the same; and what in the mean while they have not been able to vanquish, and that which wil receive no alteration, nor become any waies like the thing which is to be nourished; that they reject by another faculty, viz. the separative. And in the same place, *Lib.* 3. *cap.* 13. he writes: That al the particles of the whol Body have a power to draw to themselves that which is agreeable and friendly to them, and to force back that which is burdensom and biting. And therefore *Fracastorius* labors in vain to shew how by a certain violence such things as are separated one from another may be again joyned together. Now although this Natural Consent and Dissent of things does spring primarily from their forms: yet because the Forms do act by Qualities; some things also consent or dissent by manifest Qualities, as Water and Fire, and others by occult or secret Qualities, of which we shall speak hereafter.

Examples of the Consent and Dissent of things.

And from this Consent and Dissent of things Natural a reason may be given of many things which happen in Chymistry and Physick, and every where in the world. Salt things are mixed with salt, and dissolved by salt things; Oyls mingled with Oyly, Fat, and Sulphureous things. For examples sake, *Aqua fortis* dissolves Metals, yet can it not dissolve Brimstone: contrarywise, Brimstone is dissolved in Oyl which cannot dissolve Metals. So Gums and Sulphureous fatty Tears of Plants are dissolved by Oyl; but such things as are of a watry substance are dissolved by Wine and Water, not by Oyls. 'Tis a common Practice for a man that hath fouled his Hands with Pitch not to wash them in Water, but in Oyl or Grease, which wil dissolve the Pitch. And every where in the composition of Medicaments such things occur, especially in the making Plaisters, which if the Apothecary be ignorant of, he wil lose both his labor and materials. Also precipitations so called do afford a rare document hereof; when Gold, Silver, Corals, Pearls, Crabs-Eyes, and such like, are dissolved and precipitated. To speak only of Corals and Pearls; for examples sake (for the same reason holds in al) these Bodies are dissolved by the Salt of distilled Vinegar, or the like sharp Liquor, whereunto that same Body in regard of affinity is so joyned and united by the most subtile Atomes, that it may be strained through a brown paper. To this Liquor (containing in it the Body of Corals and Pearls) if you drop in Oyl of Tartar made by *deliquium*, or Oyl of Vitriol, the Salt of Solvent Liquor unites it self to the Oyl of Tartar or Vitriol by reason of affinity, and leaves the dissolved Body; which being so left unto it self descends to the bottom by its Natural heavines, which they cal precipitating. Also how great the force of Gunpouder is there is no man ignorant; and that proceeds only from the antipathy that is betwixt Brimstone and Salt-peeter. From the same proceed Lightnings, Thunders, and Thunder-bolts. For if in the Globe of the Earth Sulphureous, Nitrous, and watry Vapors are at once raised aloft, in the lowermost Region (truly) of the Air, where it compasses us about, being dispersed into very smal atomes, they fight not together: but when in the Clouds the fiery atomes or particles are joyned with fiery, the sulphureous with sulphureous, the watry with watry, at last resuming Courage on both sides they fight furiously, and both fly from, and chase away their Enemy. Hence the Fire shunning the Water Lightens out of the Clouds. From this Fight rumblings and Thunder-cracks are raised, and that same Fiery and Sulphureous Spirit breaking out of the Clouds melts, burns, or throws down whatever it meets with. Also there is a vulgar example hereof in Quick-lime, upon which if Water be poured, the fiery atomes which lay hid therein flying the water as their Enemy do break forth. Whereupon being collected they have raised so great heat, that they have been known to set on fire some wood that was at hand. Also if you put Spirit of Nitre to Butter of Antimony, or Oyl of Vitriol to the filings of Steel or Iron, there arises a boyling and a noise, yea, and a flame too. Where nevertheless it is to be noted, That it is credible that this same boyling is not caused only by the fight of Contraries, but also by the sudden motion of like parts to like. Also from this Consent and Dissent of Natural things many Questions in Physick may be answered, and Controversies composed. That Burns are cured by burning things, viz. by holding ones burnt hand against the fire, or by smearing the burned parts with Linseed Oyl, or an Oyntment made of Onions; and parts nummed with cold, by rubbing them with Snow, or dipping them in cold water;

Precipitation.

The cure of persons burnt, and such as are frozen and with cold.

and that Apples or Eggs being frozen, are cured by putting them in cold Water: all these effects happen because hot things draw hot things to themselves, and cold things draw cold things. Also Physitians dispute about the temper of Camphire, while the Ancients say 'tis cold, and most late Writers hold that it is hot. Howbeit the taste and its aptness to burn do so manifestly convince it to be hot, that I wonder any man can doubt thereof. The only thing which perswaded others that it was cold, is because it does cool. But this it does, not of it self, but by accident, viz. Whiles it draws the fiery and sulphureous atomes, out of the Body unto it self, by reason of similitude: which the flowers and water of Elder do in the Rose or fiery Inflammation so called, as also Oyl mixed with Lye.

The temper of Camphire.

Chap. 6. *Of the Matter of Natural Things.*

NOw, as God created al the Forms, so he gave unto them Matter, such as was fitting for every Form; and that there might be an interchangable course of things, and alwaies fit matter for sundry Forms, God created the Heaven and the Elements. The Heavens, that by their Influence they might cherish and govern the Generations of inferior Bodies; and the Elements as simple Bodies, which by their actions might further the interchangable course of Generations and Corruptions, also might afford matter to living Bodies.

Whether there is any other matter of Bodies besides the Elements?

But whether there are yet other simple Bodies besides the Elements, which may afford matter to living things, is made a Question, not without cause. With the Peripateticks indeed it is out of question, that there are in this sublunary World no simple Bodies but the Elements; and that of them al others are compounded. Howbeit, many have doubted hereof, and that not without cause. *Johan. Francisc. Picus Mirandulanus*, in his Book of Elements, chap. 3. writes: *If there be any that will not content themselves with the Opinion and Authority of the Philosophers, and will maintain that there are yet some other Elements mixed with those vulgarly known, which by a secret power of Nature concur to the constitution of sublunary things, they can hardly be substantially refuted.* And *Jacobus Schegkius*, in his Book of the Power and Efficacy of Heat, chap. 4. writes, That every Body is either an Element, or compounded of Elements, or hath some proportion and similitude with the Bodies Cœlestial. And that he had out of *Aristotle*, who in 2. *de Generat. Animal. cap.* 3. writes, That the heat in living things is neither fire, nor hath its Original from fire, but is of analogy to the Heavenly Matter. But what that Body is, and whence it had its Original, cannot be explained without the Creation of the World. But from the Creation of the World all these things are clear. For God did not at first command the Elements to fight together, to make up mixt Bodies, of which afterwards Plants and living things were to be made; but as he gave to Plants and Animals their Forms and Souls, so he gave unto each of them their peculiar Bodies. Which although (for I wil not now dispute that point) they may be constituted of the Elements as to their matter: yet that there should be nothing in them but Elements, and that the forms of these Bodies are Elementary, and that the Souls of Living Creatures are received in a Body simply constituted of the Elements; and that so the Elements considered either as simples, or as mixt Bodies, should be the immediate subject of Souls, there is no firm demonstration to prove; nor is it yet proved, That that which *Aristotle* saies holds proportion to the Element of the Stars is a meer compound of the four Elements so called. For since more noble Forms do require a more noble Matter (as *Aristotle* also teaches) the Creator gave to every Form a convenient Body, each of which receives its nobility and activity from the Form, which (as *Scaliger* speaks, *Exercitat.* 307. *Sect.* 20.) is a fift Nature, far differing from the four Elements. And in very deed, that Spirit which is inbred in Animals and Plants is a wonderful thing, which first is in a smal quantity of seed, and afterwards by means of the Blood flowing in at the first formation of the yong one, and then by the Aliments taken in it is encreased to a great bulk, and goes al over the whol body of an huge Animal, and warms and enlivens the same so long as the Creature lives. And although this Spirit be of its own Nature hot, yea, and heat it self, though the admixture of other things with it makes that it is not discerned, yet is it really in them; and it may be separated from them, as appears in Spirits made out of Plants. Where this is also to be noted, That as nothing is nourished but what hath life, as *Aristotle* teaches, 2. *de animal. cap.* 4. *text.* 46. so nothing can properly nourish, unless it be a part, fruit, or effect of a thing animated or endued with a Soul; and therefore in al aliments there ought to be some of that Spirit which they vulgarly cal *Calidum innatum*, or inbred heat; and there

their food does not only restore the moisture, but the heat also.

Nor do other Bodies which seem to be only mixed and not animated arise from the mutual fight of the Elements. It is a point of smal discretion to beleeve that Wine, Oyl, Honey, Sugar, do arise from the mutual fight of the Elements. The truth is, God did not create those things at the Beginning. For there is no Wine before Vintage, nor Oyl til the Olives are gathered, bruised, and pressed; nor Honey before the Bees make it, nor Milk before living Creatures that bring forth live yong ones become with yong. But God created such things in their Principles, that is to say, he gave a power to the Vine to make such a Liquor as Wine out of the nutriment it draws out of the Earth, the Olive tree such a juyce as the Oyl, a Reed to breed such a juyce as we cal Sugar; and to the Bees he gave power to gather juyce out of Flowers, and thereof to make Honey; to the Dugs a faculty to make Milk.

And here the Chymists bring in their Principles, concerning which I have spoken largely in my Treatise of the Consent and Dissent of the Chymists with the Galenists and Aristoteleans. That I may say a little of them in this place; first of al, those who do not simply allow them as Elements, do grant them to be the first mixt bodies. About which I wil contend with no man, if I may but obtain thus much, that in such a Sence they may be called Principles, because in the resolution or separation of mixt bodies Art can hardly proceed any further, yea, and perhaps Nature goes no further, which when she makes a mixt body does not immediately constitute the same of the last Principles, but rather of these first mixt bodies: whereof I shal speak more hereafter in my Third Discourse concerning Mixture. And this is most of al manifest in the Nourishment of Living Creatures. For neither is the *Chylus* made immediately of the Elements, but of Bread, Flesh, Fish, &c. Nor is Blood made of the Elements immediately, but of Chyle, as we shal shew more at large when we come to speak of Mixture.

Moreover, this also is worthy our Consideration, Whether those first mixt bodies do consist of the Elements only? or whether they received from God in the first Creation a Form different from the Forms of the Elements, since God created not the first matter only, but also the second, and gave every Form its proper matter and subject, by which they preserve themselves, and remain entire in the sundry Vicissitudes of Generations, and being variously mixt do afford matter to other natural things. Truly as the Expositors of *Aristotle* are too long in their Disputations of *Materia prima* or the first matter, so are they over-sparing in the Consideration of the second Matter, whereas every Form does nevertheless require its peculiar matter or subject. For neither can every body be the proper matter and subject of every form, especially of Souls, but in living Creatures it must be so disposed of necessity as that it have an immediate aptitude to receive a Soul, and to be converted into the substance of a living body, and to be nourished by the nutritive faculty. Which disposition proceeds from the peculiar Forms. Now that there are in Plants and in living Creatures forms distinct from the Soul, which belong to the proper Constitution of the Subject of Souls, is also sufficiently manifested by the wonderful operations of dead Plants, and the parts of dead Creatures in Physick. For since every action flows primarily from the form, and these actions are more noble than that they can proceed from the forms of the Elements, either simple or mixed; of necessity there are other forms besides the forms of the Elements, from which these actions proceed; and I see no cause why I may not cal them with *Scaliger*, a fift Essence, and the Body wherein they are, with *Aristotle* and *Schegkius*, a thing answering to the Element of the Stars; And some of *Aristotle*'s Interpreters (among whom *Zimara* especially) do hold, That not only Souls are super-added to the Forms of the Elements, but also that the form of mistion is a fift form really distinct from the forms of the four Elements, and super-added to them.

There are Forms super-added to the forms of mixt Bodies.

Hence, Whereas they say, That some bodies are simple, others compound, and that some are more, others less compound; that does not come to pass by reason of the first matter and Elements, but in respect of the Forms. For since al mixt Bodies consist of the four Elements, in that respect one is not more compound than another. But because some forms do presuppose other some, and cannot perform their operations save in a subject after a certain manner disposed by other forms: such Bodies which contain divers forms besides the Elements are termed Compounds, such as are the Bodies of al living things. Hence that form is most perfect which hath most other forms under its Command.

THE SECOND DISCOURSE.

Concerning the occult and hidden Qualities.

Chap. 1. *What hidden Qualities are.*

SInce to Know is to understand a thing by its Cause, we must labor with all our might, that in the things of Nature also we may render the true and proper Causes of all operations and effects. That there are indeed in nature four Elements, and that they work by their first qualities (so called) which are obvious to the Sense is a thing out of Question. But there are very many Effects in Nature which can no waies be referred to those Qualities. And therefore the most acute *Julius Cæsar Scaliger* in *Exercit.* 218. *sect.* 8. ingenuously and freely writes, that to reduce al Effects in nature to the first qualities is extream Impudence. And those who endeavor to do so, it happens to them as *Galen* writes of *Epicurus* and *Asclepiades*, in *Lib.* 1. *de natural. facultat. cap.* 14. that either they alleadg fooliſh and ridiculous reasons, or deny those things which are confirmed even by Experience, and as *Thomas Erastus de occultis medica. proprietat.* writes, they get nothing but to be derided by all that are studious of the truth and knowing in the things of Nature. And therefore *Galen Lib.* 11. *de simp. med. facultat.* when he treats of the vertue of the ashes of River Crabs against the biting of mad Dogs, acknowledges their said faculty proceeds altogether from their whol substance, and reprehends his Master *Pelops* because he boasted very ambitiously, that he knew the Causes of all such things; and promises that he would at one time or another write a Book concerning such things as act by the propriety of their whol substance. And if there were nothing else to perswade us how vainly and rashly many have endeavored to reduce all things to the first qualities, Poysons at least and their remedies might teach us so much, as the same *Scaliger* tels us in the place fore-alleadged. I for my part do freely and boldly pronounce, that there is hardly any more pernicious opinion, and which hath more wearied even the best wits and worn them out with vain and fruitless labor, than that of those men who endeavor to assign causes of all things which happen in nature from the four Elements and natural Qualities. For whether you consider them as simples, or however mixed and remixed, and however you may suppose their Qualities to be tempered, nothing can proceed from them but what is Elementary. And it is al one whether more or fewer come to sup without money, for they must all fast. But this error hath been hitherto sufficiently common, nor hath it kept it self within the bounds of natural Philosophy, but hath also crept into Physick, whiles many men have vainly endeavored to fetch the differences of all Diseases, their Causes and Symptoms, with the virtues of medicaments, from the first Qualities.

Fernelius defends occult Qualities.

But in very deed, certain most experienced Physitians have long since acknowledged this Error and warned others thereof, amongst the rest *Johannes Fernelius*, a most excellent Physitian, who *in two Books de Abditis rerum Causis*, hath most learnedly demonstrated, that many things are, and are performed in Physick, whose causes 'tis vain to draw from the temper of the first Qualities. For which excellent pains nevertheless of his he hath gained nothing from some but reproach and back-biting. And no wonder; for the world is governed by opinions: and many think it not very honorable, yea and a foul disgrace too, to

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lay down the Errors they have unwarily drunk in, and to admit and acknowledg the truth, though it dazle their Eyes with its most cleer brightness; and therefore whatever they are ignorant of they esteem as new and false. Mean while all more learned Philosophers and Physitians have undertook to defend the truth, and have constantly taught, that the Causes of many things in natural Philosophy and Physick do depend upon hidden Qualities, and that we are glad oftentimes to fly to the saving Sanctuary (as *Scaliger Exercit.* 218. *sect.* 8. names it) of an occult Propriety: which whiles it is called ignorance by some, they rather accuse the weakness of our understandings to dive into the secrets of Nature, then blame these hidden Qualities. For if the true Original of these qualities be sought into, (whereof few have taken care) the knowledg thereof wil produce as certain science as that of the first Qualities. For the natural Philosopher knows no more of Heat, but that it Heats, and that it flows from and depends upon the form of Fire: which form is to man as unknown as those forms from whence the hidden qualities arise. For as *Scaliger Exercit.* 307. *sect.* 29. saies, The Form is a divine thing, the perfect knowledg whereof is hidden from us, and therefore to search further is the part of an unquiet and over-busie mind. And therefore those who traduce these Qualities, by calling them the Sanctuary of Ignorance are long since worthily refuted by *Avicenna, Lib. de virib. Cordis, tract.* 1. *cap.* 10. when he thus writes: As he that knows fire warms by reason of the heat therein, truly knows and is not Ignorant: so he that knows the Load-stone draws Iron because it hath a virtue in it whose nature is to draw Iron, without doubt is knowing, and not Ignorant. *And afterwards*: The Ignorance of the Causes of this Virtue in the Load-stone is no whit stranger than the Ignorance of the Causes disposing things be to red or yellow, or the Body to the Soul. But admiration ceases in things we are used to, and our mind neglects to enquire concerning them. But that which happens seldom stirs us up to admiration, and moves us to enquire and contemplate the causes thereof. *And a little after*: If that Fire were a thing hard to come by, and brought from far Countries, People would more admire the properties thereof than the properties of other Bodies, and more enquire into the Causes of its proprieties than into the Causes of other Proprieties, because its proprieties are very wonderful. For the presence thereof brings the sight from aptitude to act, and it will not suffer it self to be touched; also it mounts upwards, and makes such things as it can master to ascend with it, and of a smal quantity thereof in the space of an hour a great quantity is bred; and it corrupts every thing it meets with, and changes it into its own substance; nor is it lessened though you take some from it. And these things are in truth more wonderful than the drawing of Iron by the Load-stone, or than other Proprieties. But because these are usual, and dayly seen, we cease to admire them, nor are careful to enquire into their Causes. But the action of the Loadstone, because it is rare and unusual, induces to admiration, and provokes men to enquire after its causes. And indeed if we enquire into the original of these hidden qualities, there may be had of them as certain knowledg as of those that are manifest. For in this darkness of humane understanding the form of the Fire is to us as unknown as that of the Loadstone, and as the Poet sings.

Whether occult Qualities be the Refuge of Ignorance.

The occult qualities cause science.

The wonderful properties of Fire.

Nature's wont to hide many things with a Sacred cover:
Nor is it fit that mortal men should come to the knowledg
Of all things, since that many are more fit for a wonder.
And so far the truth of things is set from our Eye sight,
That we may hardly be said to know the things we do handle.

Now these Qualities are called Occult, Hidden, Abstrute, to difference them from the manifest qualities which are discernable by the external Senses, especially the Feeling; whereas contrariwise these are not perceivable by the Sense, although their operations are. So we see the attraction which is made by the Load-stone; but we perceive not the qualities which causeth that motion of the Iron. So we perceive with our senses the evacuation caused by purgative medicaments; but we do not perceive that quality by which the purging medicaments do work that effect. After the same manner, we perceive with our Senses the symptoms which Poysons do stir up in our Bodies; but the qualities whereby they cause the said symptoms we perceive not by the sense. By our Senses (for example sake) we perceive Heat in the Fire, by means whereof it heats: but it is not so in those operations which are performed by occult qualities. We perceive the Actions but not the qualities whereby they are affected. Hence these qualities are termed hidden and specifical proprieties, faculties proper to substance; and such Agents are by *Galen* called things acted by their whol substance, or by a propriety and familiarity of their whol substance, 6. *Epidem. Com.* 6. *text.* 5. 11. *de simpl. med facult.* and elsewhere.

the names of occult Qualities and what they are.

Chap. 2. *Whether there are occult Qualities, and things that act by their whol Substance.*

'Tis proved that there are occult qualities.

NOw that there are occult Qualities and actions proceeding from occult Qualities, is from two things chiefly apparent. The first is, That there are many actions in Nature which totally differ from the actions of the Elements; The second is, That the way and manner of the actings of such things as work by occult Qualities, is far different from that of the Elements.

The actions of occult qualities different from those of the manifest ones.

As to the first, What the actions of the Elements are, is known, viz. To heat, to cool, to moisten, and to dry, and such as follow them, to rarefie, make compact, &c. But there are actions in Nature far different from these. The Load-stone draws Iron; a Cat (though shut up in a chest) does so work upon some people that they are ready to fall into a swoun; a little Quantity of Opium stupifies a man and brings him into a dead sleep; what mischief the biting of an Asp, a Viper, a mad Dog works in our Bodies, al men know; what strange symptomes does the biting of the Spider *Tarantula* cause; of which I have spoken in the first Book of my Practice, part. 2. cap. 17. And how great the force is of a little pestilential Infection, many know to their sorrow. And these Venoms are not cured by heaters, moisteners, coolers, dryers, but only by such things as work by occult Qualities. And as was before wel said from *Scaliger*, If nothing else could perswade how vainly and rashly many endeavor to reduce al effects to the first qualities; at least Poysons and their Remedies might convince us. And a thousand such actions are every where met with in the course of Nature. Since therefore such actions are of a quite different kind from the actions of Elementary Qualities, and surpass their faculties, we do therefore justly distinguish these Qualities from those which are manifest to the Sense, and term them occult. *Galen* knew this, who writes in his 6. *Epidemic. Com.* 6. *text.* 5. and 3. *de temperament. cap.* 4. expressly, that poysons do not at al act after the self-same manner as fire and water, but by a contrariety of their whol Nature. And *Lib.* 5. *de simplic. medicam. facult. cap.* 1. 18, 19. he writes, That there are some things contrary to us by their whol substance.

Also the manner of acting is different.

Again, The Elements have a much different manner of acting from that of those things which work by occult Qualities. For the Elements (to exercise their Faculties) require a sufficient bulk of Body, nor can they exercise their forces in a very smal quantity. For though fire be extreamly hot, and Snow extreamly cold; yet as *Galen* wel writes in his 1. *de Temperamentis, cap.* 4. a very smal quantity of either of these works no effect in our Bodies; yea, bodies so qualified do not kil a man though taken in a good quantity, whether hot or cold; as Snow, Pepper, cold Water. Again, they do not work such sudden mutations in the Body. But some Poysons kil a man in the smallest quantity imaginable, or stir up most grievous Symptomes, and that in a moment. Of which *Galen*, *Lib.* 1. *de Semine, cap.* 16. thus writes, *The smallest portion of a deadly poyson being entred into a man or other Creature, does change it totally in a moment of time, and qualifie the same with a disposition like it self.* Again in his 3. *de locis affectis, cap.* 7. he saies, *Who would beleeve that from the stinging of a Scorpion, or of the* Philangium *(a Spider so called) the whol body should be so exceedingly and unusually changed, unless he had often seen the same with his Eyes, especially considering the sting of those Creatures is a very smal thing.* And a little after: *The sting of a Sea Turtle, as also of a Land Scorpion, does end with an exceeding smal point; where there is no hole through which the poyson might be cast in: yet we must needs suppose that there is some substance in the Nature of a spirit, or of a Liquor, which though very smal in bulk, yet is very great in activity.* And *Ælian* in his 9. *B. de Animal. cap.* 7. relates, that the prints of the biting of an Asp are so exceeding smal that they can hardly be discerned by a sharp sight. And *Jul. Cæs. Scalig.* in *Exercit.* 153. *Sect.* 11. and *Mercurialis* in his Book *de Venenis. cap.* 16. do write, that in *Nubia*, which is a part of *Æthiopia* beneath *Egypt*, there is poyson, the tenth part of a grain whereof wil kil a man, or one grain ten men, within a quarter of an hour: or if one man take one grain it kils him presently.

Occult qualities known & asserted by learned Men.

By which Reasons most learned men being moved, have acknowledged and taught, that there are very many Qualities in Nature, besides the Elementary. *Galen* (as we said before in the beginning of our first chapter of this Discourse) in his 11. *de simpl med. facult. cap.* 14. where he treats of the vertue of the Ashes of River Crabs against the biting of a mad Dog, reprehends his Master *Pelops* that he vain-gloriously boasted that he knew the causes of al such things:

things: and in his first *de nat. facult. cap.* 14. concerning *Epicurus* and *Asclepiades* he writes, That those who endeavor to bring manifest causes for al Diseases, it commonly fals out, that either they bring foolish and ridiculous reasons, or deny those things which even experience it self confirms. And in the third B. of the faculties of simple Medicaments, chap. 3. he writes; And truly it is by us in other Treatises demonstrated, that there are in all things certain Agreements and Repugnancies of Qualities, and that which is familiar is readily assimilated, but that which is contrary kils both Plants and Animals; also that these familiarities proceed from the propriety of the whol substance. And in B. 5. *de simpl. med. facult. cap.* 2. we have shewed (saies he) that Medicaments have a faculty to alter, either by one quality, viz. By heating or cooling, moistening or drying, or by some of the said qualities joyned together, or by their whol substance; as most deadly poysons, many Antidotes or amulets, and al Purgers. Which also he repeats in the same Book, chap. 17, 18, 19, 23. The same he teaches in the 6. 8. & 9. *de simp. med. fac.* the 1. *de compos. med. secundum genera, cap.* 16. the 8. *de compos. med. secundum loca, cap.* 8. the 13. *de Methodo medendi, cap.* 6. *Alexander Aphrodisæus* writes in his Proeme to the Problems, that there are in these things in Nature, which can be known only by experience, and are therefore by Physicians termed Hidden Properties; and he reproves those who endeavor to render the Causes of such things from the qualities of the Elements, and that they scurvily botch up certain solutions which are altogether unprofitable and improbable: whom *Mesues* and other Arabians do follow. But in the Age last past, *Johannes Fernelius* that most learned Physician does largely and learnedly maintain these Qualities in his 2. Books *de Abditis Rerum causis*; who in the Preface to his second Book thus writes. Many indeed laugh at the Atomes of *Democritus*; but *Democritus* if he were to rise from the dead would much more (after his manner) laugh at these Elements we talk of, inasmuch as some endeavor to draw the causes of al things in Nature from them. The most acute *Jul. Cæsar Scaliger*, in his 218. *Exercit.* Sect. 8. writes, That it is a point of extream Impudence to refer al things to manifest Qualities; and in *Exercit.* 101. Sect. 14. thus he bespeaks *Cardan*: What evil Alexandrean spirit hath so bewitched thee that thou shouldest pitifully beleeve it possible that the Load-stone should draw Iron to it only by the mixture of the Elements? And in his first Book of Plants, treating of Tasts, he hath this passage: But if any man shal say, That Taste is made by a conspiration of the four first Qualities, let him tel me, Whether in any Element as an Element there is any Taste? There is truly none at al. But as neither life proceeds from the Elements, nor laughter, nor sense, nor understanding, nor voluntary motion, but from other forms besides the Elementary; even so does Taste also. And though there were no other thing to perswade us that there are other occult Qualities besides the Elementary; we might be satisfied only by the consideration of Poysons. The same *Scaliger* in *Exercit.* 218. *Sect.* 8. saies: Many of them have Proprieties different from the Elementary Qualities, which are concealed from temperate minds, and delude the curious. And *Thomas Erastus* in his 4. chap. of the Hidden properties of Medicaments (which place I alleadged in the first Chapter) saies, That they who would reduce al effects to manifest Qualities do gain nothing, but to be justly derided by al that are studious of the Truth, and skilful in the things of Nature. Also *Joban. Francisc. Ulmus* hath defended, explained, and by many examples proved the said occult Qualities, in *Lib.* 4. *de occultis in re medic. proprietat.*

That which *Galen* saies happened to them that reduced al things to first Qualities, that either they brought foolish and ridiculous Reasons, or denied such things as were evident, that also happened to *Sanctorius*, who in his *Lib.* 8. *Methodi Vitand. in Medicin. Error.* endeavors to reduce hidden and occult properties to manifest qualities: Whose Discourse of that Subject I think fit briefly to propound and examine.

Sanctorius *his Discourse of Hidden Qualities examined.*

But at first, in *cap.* 3. by way of a Ground-work he premises that Question, Whether the Faculties of the Soul do essentially differ from the substance of the Soul? or Whether they are in the same predicament therewith, viz. in the Predicament of substance; and he conceives the Fountain of that error concerning occult qualities to be, that those who hold there are qualities of the whol substance, do conceive that they belong to the predicament of substance. For suppose indeed that some there were who conceived the Faculties of the Soul differed not from the Essence thereof; yet they held an Error. And herein we willingly assent to *Sanctorius* when he holds the powers of the Soul are not substances; but that they differ from substances and are qualities. But if such things are sometimes by Authors attributed to Faculties which are proper to substances, there is an equivocation in the word *Potentia*, power or Faculty, which sometimes (and that properly) is taken for a quality, but

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somtimes (though improperly) for a substance, having a power or faculty to act. And such substances are not only Souls, but also other forms, as that of the Load-stone. For all forms are substances which have their powers of exercising certain actions, all which they do not perform by manifest, but some by Hidden Qualities. He labors therefore in vain chap. 6. while both by Authorities out of *Galen*, by reasons and experiments, he endeavors to prove, That hidden Qualities proceed not from the substance, but from the manifest Qualities. For in the first place, that which he brings out of *Galen*, 12. *Method. Medend.* and other places, that occult qualities have their contraries, but substances have no contrary, is of no moment: for the occult Qualities are not substances, but qualities flowing from their forms. And if there be any other such arguments, they touch not our Opinion, but that of *Fernelius*, who holds Diseases of the Form. Moreover, that which he brings out of *Galen*, *Lib. de Constit. Artis*, *cap.* 8. and 4. *de simpl. med. cap.* 15. and 2. *de locis affectis*, *cap.* 8. deducing unutterable proprieties from sundry alterations, all that we grant. But if only the first qualities be mixed, no occult qualities can arise from thence, but only a temperament of the first qualities; though the degree of the temper or mixture cannot always be sufficiently explained. So, when he saies, that of bitterness, sweetness, harshness, and acrimony mingled there arises a quality, which because it cannot be expressed by one name, may be termed ineffable or unutterable, al that we grant; but yet no occult quality, such as is in the Load-stone, Poysons, and such like, does thence arise, but only a tast, being only a manifest quality perceivable by the Tongue. Of the same moment is that which he alleadges as an experiment, that out of divers colors mixed peculiar colors arise. For whatever colors are mixed, nothing arises therefrom but color; but no occult Quality. And although of an hundred other altered qualities the determinate degree cannot be known: yet the power of drawing Iron which is in the Load-stone cannot be made thereof as he falsly conceives. Out of the first Qualities only temperaments of tangible Qualities are made, though the determinate degree is not always known; out of colors colors, out of Tasts Tasts are made. But never out of the first qualities, or tasts, or colors, can be made the power of drawing Iron, or of purging, or of stupifying like Opium, or such as is in the Venom of the Pestilence. From al which it is manifest that *Sanctorius* hath not rightly formed the state of the Question, but dallied with the equivocation of the words Ineffable and Occult Quality, and was ignorant what that Occult Quality meant which is intended in the Question.

Sanctorius his arguments examined.

But whereas in the seventh chap. he labors to find out the differences of Occult Qualities, therein he does wel in that he labors to fetch them from the Subject; since the condition of al qualities depends upon the first Subjects. But when he endeavors to deduce them from the first manifest Qualities, and second, as Heat, Cold, Moisture, Driness, Rarity, Density, he makes himself a laughing stock. For whereas in the first place he conceives the proper subjects whereby the Qualities may be defined may be taken from a substance considered as corporeal; he is exceedingly out. For from a Substance as Corporeal nothing proceeds but quantity and dimensions. But on Bodies not considered as Bodies, but as furnished with certain Forms, the occult qualities and all others depend. Moreover, whereas he makes the Principle of al Passion to be Density and Rarity, and deduces the qualities both first and second, hot, cold, moist, dry, hard, soft, stiff, crumbly, rough, smooth, thick, thin, from Rarity and Density, that therein he is in an error is so clear that it needs no proof. And let it be granted (truly) that those Qualities proceed from Density and Rarity: yet all these qualities are not occult, concerning which our question is, but tangible qualities. And that is yet more absurd, that he endeavors to bring al from Scituation, and saies that Scituation is the general kind of al: For from the Scituation of the parts of a Body proceeds Rarity and Density, and from Rarity and Density hot and cold, moist and dry, also hard and soft, with the passions, and passive qualities.

Of the differences of Occult Qualities.

And he becomes perfectly ridiculous when he writes chap. 10. That he saw in *Hungaria* an Italian Gentleman, who when he was near a Cat (though he saw it not) he presently swooned, and unless the Cat had been driven away would have been choaked; and he supposes the cause hereof was Compactness and straitness. For that the Gentleman was narrow chested, and apt to a Tissick, and in the Cat there were three destructive things for those in the Tissick, viz. Its Brain, Breath, and Hair. Therfore he conceives it is no marvel if of these a new stopping quality was bred which might by the exhalation of the Cat be communicated to a man, and by condensing choak him. But one absurdity being granted, a thousand follow. For I my self (and many others) have known such as could not endure the Presence of a Cat, yet are they not troubled with the Tissick. Moreover, if the destructive Faculty be

Of the Antipathy betwixt a Man and a Cat.

in

in the Brain, Breath, and Hairs, it is not Denſity. Thirdly, If Cats do this by their thickning breath, why do Cats ſhut up in a Cheſt work the ſame effect? Fourthly, Thoſe that are troubled in this kind do not complain of the *Aſthma* and ſhortneſs of breath, but only of fainting fits.

That there are Occult Qualities which ariſe not from the firſt, proved by certain Experiments.

But the beſt thing in this Diſcourſe of his is that which he hath in chap. 10. where being convinced by the Truth it ſelf, he proves by many reaſons and experiments, that there are Hidden qualities which do not ariſe from the firſt qualities, whereof I ſhal ad only ſome, viz. Thoſe which directly prove that occult qualities do not flow from the firſt qualities.

The firſt Experiment is of the Load-ſtone, which is notoriouſly known to draw Iron, which Faculty nevertheleſs cannot be reduced to any firſt quality.

Secondly, If *Doronicum* did kill Dogs by vertue of Heat or Cold, it could not cure Men.

Thirdly, If Scorpions did kil by Heat, the drinking of pure unmixt Wine would not cure their poyſon.

If a dram of *Opium* kils by its coldneſs, why wil not an ounce of Ice (which is colder) do as much?

But the reſt of the Experiments which he brings do not prove that occult qualities flow not from the firſt; yet againſt thoſe who endeavor to derive al qualities from the firſt, they prove there are qualities which flow not from the firſt. For ſince alteration and the action proceeding from the firſt qualities is not effected in a moment, but gradually and in time; and that there are many mutations of qualities which happen in a moment, thence it appears that there are qualities which are not made by mutation of the firſt qualities. For if a red Glaſs be put before a blue Glaſs there ariſes therefrom in a moment a Violet color; if a blue Glaſs be put upon a yellowiſh Glaſs, there ariſes therefrom a green color; Water wherein Galls have boyled is clear, but if Water be poured thereinto wherein Vitriol hath been boyled, which is alſo clear, there ariſes a black color in a moment; and there are many ſuch mixtures which produce a new quality in a moment.

All things are not vain which are reported of Occult Qualities.

Finally, Whereas in cap. 11. he writes, That the maintainers of occult qualities have been too credulous to beleeve the moſt vain reports; I confeſs indeed that many fabulous and ſuperſtitious tales go up and down; but in the mean time, al things are not fabulous which are ſpoken of the effects of occult qualities. Doubtleſs thoſe reports of the Load-ſtones Faculty to draw Iron, of the ſtupefactive faculty of Opium, of the Faculties of Poyſons and Antidotes, of the Antipathy betwixt ſome people and Cats, are al moſt true, and any one may dayly experiment the ſame. And whereas he accounts for fabulous al that is ſaid of ſundry things hung about the Neck, or tied to the Body, he does it without cauſe; ſince thoſe things which are reported of Peony Root, the Elks Claw, the Nephritick Stone, and ſuch like things, are known by Experience to be really true. So alſo, thoſe things which are written of the Echeneis he can by no other reaſon confute ſave that it cannot produce ſuch an effect by heating, or cooling, or rarefying, or rendring compact, or the like qualities. Others there are who account the Narration concerning the Echeneis to be fabulous; but *Pliny*, *Lib.* 32 *cap.* 1. confirms it by Hiſtories, thus writing: *The Fiſh Echeneis or Remora, held the Prætorian Ship of* Antony *in the Actian Sea.* And a little after he ſaies: *It ſtopped alſo in our Memory the Ship or Galley of Prince* Caius *as he was ſailing from* Aſtura *to* Antium. *Nor was there long wondring at that ſtay, for preſently the cauſe being known, when of the whol Fleet that Galley only did not ſtir, ſome leapt out into the water to ſeek the cauſe, and they found the ſaid Fiſh ſticking to the Rudder, and ſhewed it to* Caius, *who ſtormed that ſo mal a thing ſhould ſtop his courſe, and fruſtrate the endeavors of four hundred Rowers.*

A Story of the Echeneis, Remora, or Stop fiſh

Therefore *Franciſcus Valleſius*, *Controverſ. Med. & Philoſ. Lib.* 8. *cap.* 5. ſaies, That it is a ridiculous thing to deny that which is manifeſt by Experience, becauſe we cannot tel the reaſon thereof. As if it were impoſſible any thing might happen in Nature of whoſe cauſe we are ignorant. We are ignorant of moſt things. And therefore they that would in Natural Philoſophy find out the Truth, and not fal into wild and ſophiſtical Opinions, they muſt begin with things known to the Senſe, and ſo proceed to the Cauſes, and having found them rejoyce in the Works of Nature; and not finding them, confeſs their own ignorance; but by no means deny things that are manifeſt. For it is leſs ſhameful having found out the effect to be ignorant of the Cauſe, which is frequently hid from the moſt expert Philoſophers, than together with the cauſe to be ignorant of the effect, which when you deny, the common people wil laugh at you, and prove it by experience.

'Tis ridiculous to deny a manifeſt effect becauſe the cauſe is unknown.

CHAP.

Chap. 3. *Of the Original of Occult Qualities.*

NOw to find out the Original of Occult Qualities is a very hard thing, nor are all men of the same Opinion concerning their Rise. For in the first place, some there are who being moved with the evidence of the thing it self, dare not deny occult Qualities: but when they come to search out their Original, they fal back to the Elements and their Qualities, and endeavor vainly to derive the occult Qualities from their mixture and temperament: and conceive the hidden proprieties of things do proceed from a peculiar temper of the first Qualities, which therefore they term *Idiosyncrasia*. It is not (truly) sufficiently apparent what *Galen* thought in this point, since that Book which in *Lib.* 11. *de simp. med. fac.* he promised to write of things which operate by their whol substance, and which he cites in the 6. *Epidem. comm.* 6. *text.* 5. is lost through the injury of time; yet he seems to encline to this Opinion, and to rest much in the first Qualities. For in the 1. *de Element. cap.* 7. he writes, That our Bodies are altered only by being heated, cooled, dried, moistened; for that these Qualities only do totally change through their whol substance. And when in *Lib.* 3. *de Temper. cap.* 3. he had said that the four Faculties of the Body, Attractive, Retentive, Concoctive, and Expulsive, were in every Body effects of the whol substance; he adds, that the said whol substance consists of Heat, Cold, Moist and Dry, mingled together. And in Chap. 4. he teaches us to observe for a Principle, that every body hath a certain propriety of Temper, which is convenient to this Nature, disagreeing to that. And hence he gives the reason why several things are Food or Physick for several Creatures; as for instance, Hemlock is Food for the Starling, and Hellebore for the Quail, which are Medicaments for men; because the temper of the Starling and Quail can assimilate the Hemlock and the Hellebore, which Mans Temper cannot do. Most late Writers have been of the same Opinion, not being able to raise their Minds beyond the Elements.

The mixture of the first Qualities cannot produce the occult Qualities.

But in very deed the Occult Qualities which act beyond the power of Elementary Qualities cannot proceed from the Elements however mixed, nor from their Qualities however tempered. Nor can a hidden way of Mixture bring in new abilities, but which way soever the Elements be mixed and remixed, and however their qualities be tempered, nothing arises therefrom but what is Elementary. And the Proportion of manifest Qualities being unknown does not of manifest make them occult, but only breeds a temper wherein the proportion of the first Qualities is unknown to us. The Elementary Qualities are, and remain even under the unknown measure of a Temperament; and as in the Temper the Qualities do not change their Essence, so neither can they perform an action transcending their Vertue and activity. For that is a Rule infallibly true, That nothing acts beyond the powers of its own kind. And that Argument which *Jul. Cæs. Scaliger, Exercit.* 307. *Sect.* 20. uses to prove, That the Soul does not arise from the Elements, is doubtless general and of use here. That (saies he) is in the powers of the Soul which was never in the power of any Element. But there is nothing in any thing which was not actually in its Principles. For the Principles are the acts of those things whereof they are Principles. Now in the Soul there is a Faculty to move forward, backward, to the right hand, and to the left, which is not in any Element. There are also other more illustrious powers of the Soul, which are not in the Elements. For what *Scaliger* saies of the Faculties of the Soul, the same may we say of the Faculties of the Load-stone, of purging Medicaments, of Poysons, and other things. For nothing acts beyond the vertue of its own kind; and nothing can work as a Cause beyond its own adequate Act; since it fils the vertue of the Power. And though other vertues be in a mixture than are to be found in the simples singly considered: yet those Vertues are no other than Elementary, and which the several Elements joyned together have in them; and they are the first Qualities broken and allayed by their Contraries. For as I said before, if four or more come to sup together without every man his shot, they must of necessity al fast. For examples sake, If four colors be mixed, a color indeed different from each of the four arises, but nothing else save a color; not such a faculty as is in Scammony Opium, and the like. After the same manner, if you mix the first Qualities, and mix them again, other qualities indeed or temperaments wil arise different from simple Heat, Cold, Moisture, Driness; but no other Quality wil arise from thence, save an Elementary Quality or Temperament.

Nor let any man think to scape by saying, That the manifest Qualities and their Temperament do not indeed of themselves perform such noble actions, but as they are guided by a more

more noble ſpecifick Form. For no Inſtrument acts beyond the vertue of its kind, though it be directed by a ſuperior Agent. And therefore as an Artiſt uſes ſundry Tools, as the Carver his Compaſs, Saw, Chizel, Scraper, every of which performs its uſe: ſo every Form uſes its Qualities to ſundry actions. And as a Saw when the Carpenter uſes it does ſaw aſunder, but does not hew or pare; even ſo Horneſs where-ever it is does nothing but heat. Nor does the Load-ſtone draw Iron, nor Rhubarb purge by heat, but by an hidden Quality, peculiar to themſelves.

Nor is it credible (ſince the Forms of the Elements have their Qualities) that thoſe more noble Forms are barren, and produce no qualities, ſo as to ſtand in need of borrowing the ſervice of the Elementary Qualities. In a word, as things differ in their Forms, ſo do they in their Operations and Inſtruments.

Occult Qualities are not drawn out of the power of the Matter.

Nor do they bring any thing better or righter, who hold, That in every Mixture a new Form is drawn forth, and that there are alwaies new ones made, the degrees of the former remaining, and that with theſe there ſpring forth new Qualities, and that Nature firſt brings forth the Univerſal Forms, and by their help the particular ones, until at laſt ſhe come to the forms of Individuals; and that from this contemperation of Qualities ariſing from divers Forms and mixture of Bodies, which ſaving their forms do put on the Nature of matter (as it were) or aptitude, there ariſes (they ſay) an unexpreſſible propriety of temper, which may rightly in ſome ſort be termed an occult Quality. For, to paſs over other Errors touching drawings out of Forms, degrees of Forms, and ſuch like; theſe Men alſo favor nothing but Elements, and that which they had before rightly determined, viz. That an occult manner of mixture does introduce no new faculties, they themſelves afterwards deſtroy. For ſuppoſe that many mixtures are made, and that with theſe alwaies new Qualities ariſe: yet becauſe the firſt mixture is only of Elements, and no other temper ariſes from thence but of the firſt Qualities, though you remix things mixed before an hundred, yea, a thouſand times, nothing but what is Elementary, and no Qualities but Elementary Qualities can ariſe therefrom, and therefore nobler actions than thoſe of the firſt Qualities cannot be by them produced. And if Natural things ſhould be generated after this manner, and by the mediation of Forms (their degrees ſtil remaining) a progreſs ſhould be made unto particular Forms, and at laſt to ſuch as are iudividual; the forms of al things living, as wel living things as Plants, ſhould be drawn out of the Elements. Indeed that ſame Innovator, who dares vent the Dreams hatched in his own Brain to day or yeſter-day for the Tenets of reverend Antiquity, accounts it no abſurdity; who holds that the Souls of living things, Plants, and Animals (excepting that of a Man only) are made of the matter of the Elements, and that Plants and Animals (both as to Matter and Form) were both at firſt produced out of the Elements, and at this day have no other Nature, and remain through al Generations Elementary Bodies in reſpect both of Matter and Form. But this groſs and moſt abſurd Opinion can neither be by any reaſons proved, nor can the invincible reaſons of *Julius Cæſar Scaliger* againſt the ſame be anſwered. Which when he perceived, and that he could not find any probable reaſon for his Opinion, no not to make a flouriſh with, he flies to the holy Scriptures miſ-underſtood, and endeavors to ſet *Moſes* againſt *Scaliger*, as if he had ſaid, That al living and lifeleſs things were ſo produced out of the Elements as to conſiſt of Elementary Materials, both in Matter and Form, and to ariſe therefrom at this day; becauſe God ſaid, Let the Earth bring forth, let the Water bring forth the living Creature; alſo, Encreaſe and multiply. But although God ſaid, let the Earth produce, let the Water produce; yet by force of thoſe words it no waies follows, That Plants and Bruits were made of the Elements both Body and Soul, and are generated of them at this day; ſince God then created perfect Plants and Animals in the Earth and Water, which as *Fr. Junius* writes upon this place, came out of the Earth and Water wherein they were created, as Children out of the Womb. Nor does the Hebrew word *Hotzi* ſignifie to give matter, but to make and ſuffer to go out; as in *Gen.* 14. ver. 18. *Exod.* 8. ver. 18. chap. 20. ver. 2. *Numb.* 17. 8. *Pſalm* 68. 8. *Pſalm* 104. 14. and very many more places of Scripture, appears. Nor did God ſay to the Earth and Water, Encreaſe and multiply, but to living Creatures made by him, and having their ſeed in themſelves; whereof we ſhal alſo ſpeak hereafter in our Fourth Diſcourſe, Chap. 4. *Julius Cæſar Scaliger* ſaies much better in *Exercit.* 307. *Sect.* 20. *Yea, and I tell them withal, That the form of every perfectly mixt Body, although it be no Soul (as that of the Diamond for inſtance) is a ſift Nature, far differing from the four Elements.* And in *Exercit.* 307. *Sect.* 12. *If* (ſaies he) *as theſe Tormentors or Hangmen of Souls contend, the Souls were made of the Forms of Elements, the Forms themſelves corrupted could do more than they could when they were in their Integrity. But in caſe*

Whether the forms of Plants and Bruits ſpring from the Elements?

case they will have them remain entire in the Compound, of necessity they must be by another power different from themselves both mixed to certain ends and limited in certain bounds. For of them actually existing there cannot be made a thing simply one, save by a superior power, which Aristotle *calls the Beginning of Living things.* And al the Reasons which prove it, are most firm. For who is it that considers how in Plants, the Roots, Trunks, Leaves, Flowers, Boughs, are so wonderfully and variously shaped, according to the variety of sorts, in respect of magnitude, figure, Situation, color, and with so much Art and constant Symmetry, as that no Geometrician or Painter can express al that Art, wil beleeve that al these things are wrought by the Elementary matter? who wil beleeve that the most noble Fabrick, not only of Men, but of Bruits, is produced by an Elementary Nature? Who wil derive the Sagacity of Dogs, the Prudence (that I may so speak) of Elephants, the Craft of the Fox, the Magnanimity of the Lion, the wonderful works of Bees, Pismires, and other Creatures, from the Elementary Nature? And therefore from hence (as was said) *Scaliger* frames an invincible argument, *Exercit.* 307. *Sect.* 20. *That is in the power of the Soul which was never in the power of any Element. But nothing is in any thing which was not actually in its Principles. For the Principles are the acts of those things whereof they are Principles.* In the answering of which Argument, the forelaid Innovator takes pains to no purpose. For first, he doth seek to elude that same Axiome, That Principles are the Acts of those things whereof they are Principles, by saying that Matter also is a Principle, and yet is not the act of a thing. But who sees not that *Scaliger* speaks of the formal principle, the Cause of actions, and that the form is often termed the Principle by way of Eminence. Nor yet is it absurd to say, that even matter also in its way hath an act. Indeed it is not the act of the Compound which the Form affords, yet is it in the mean while a substance by it self; and as *Scaliger* in *Exercit.* 5. speaks, it is that which it is by an Essence proper to it self. And *Exercit.* 17. The Matter hath its quiddity whereby it is somwhat, and differs from other things. And the Matter gives Quantity to al things. But against that other Axiome, That there is nothing in any thing which was not actually in its Principles, he can bring no reason. Verily that which one hath not he cannot give to another Man, and unless the Earth were heavy, the Fire hot, no mixt Body would be heavy or hot. And doubtless, no affection can be in a Compound which may not be referred either to the Matter or the Form. Yet he endeavors to evade the same by some instances. And in the first place he objects the Heaven, how that it is al things in respect of its working power. But (which himself confesses) the Question is not concerning external efficient causes, but essential internal Principles; and the enquiry is, Whether there be any thing in the Compound which does not depend upon the internal essential Principles. Also the Heaven it self is an univeral, and not a particular Cause. Moreover he objects life which is from the Soul, but not in the Soul. But he ought to have observed what very many of *Aristotle*'s Expositors do note upon the 2. *de Anima, cap.* 1. that Life is taken two manner of waies: First for substantial Life, from which as a Fountain Vital actions proceed, which is in the Soul, which is the Root of al vital Powers and Actions, in which sence *Aristotle* himself takes Life, 2. *de Anima, text.* 37. when he writes, To live is the Essence of living things. Secondly, 'tis taken for the Vital Operation, or at least for the power of exercising those vital actions, whereof the foresaid substantial Life is the Principle; which being an accident, is by many called *Vita accidentaria*, accidentary Life. And therefore unless the Soul had life actually it could not communicate the same to living Creatures. Here indeed the Paradox-monger seeks an evasion to avoid this distinction by attributing this essential Life only to the Rational Soul, and the other accidentary to Bruit Beasts. But he brings no reason of this difference. Contrariwise, all the Expositors of *Aristotle* do attribute Life in both Sences to al Living things. And after the same manner, as there is in Man an Essential Life, from whence proceeds an accidental (for a Man hath not one Soul to make him a Man, and another to make him a Living thing) even so in Bruits also and Plants from the essential Life it self proceeds that accidentary Life. Yet there is this difference, That in Man by Death the accidental Life is abolished, the essential remaining; but in Beasts, both essential and accidental Life do perish. Which things were necessary to be said in this place for defence of the Truth.

whether there be nothing in a thing which was not in its Principles.

Life, how many wais taken.

Moreover, If Occult Qualities did flow from the Elements, there should be no other simple qualities in Nature besides those first of the Elements, but al should be tempers of the first, and so compounded, which is false. For the occult Qualities are perfectly simple, and arise from their simple forms; since those last forms are not barren and idle, but produce certain peculiar Qualities. For as from the simple form of Fire flows heat; so from the form

of

of the Load-ſtone flows the Faculty of drawing Iron, which is a ſimple Quality; from the Form in Rhubarb flows the Quality and Power of Purging Choler, which is a ſimple quality; and the ſame holds in al other Occult qualities. For the moſt good and great God hath not drawn al Forms out of the power of the Matter, but creared al things, and gave them their Forms; and thoſe not idle and ineffectual, and void of Forces, but endued with their peculiar Qualities, Proprieties, and Activities.

whether the occult Qualities flow from Heaven?

Some alſo there are who conceive theſe Qualities are infuſed from the Heavens. But ſince they cannot deny, That al Qualities and Proprieties do flow from their Forms, they are forced to grant that theſe Qualities alſo though they come from Heaven, yet it is not without the aſſiſtance of their Forms. But we have elſwhere proved, that the Forms come not from Heaven.

The true Original of Occult qualities. The differences of Occult qualities.

Al which Conceits therefore being falſe, it is moſt rightly determined and held, That as al other Faculties and Proprieties, ſo theſe alſo do flow from their Forms. But what thoſe Forms are we muſt now enquire. Which that we may do more readily and Eaſily, we muſt firſt ſhew the differences of theſe Qualities according to their Subjects, or of the ſubſtances to which they belong, whereby it wil appear that they have not al one Original. Bodies are ſome Living, others Lifeleſs; and of the Lifeleſs ſome have had life, as Rhubarb, Worm-wood; others neither have it, nor ever had. All which if they be diſtributed into their Ranks as they ought, ſix differences there will ariſe of Occult Qualities, in reference to their Original.

Occult qualities in certain ſorts of living things.

For in the firſt place there are certain hidden and wonderful Properties, which alwaies are found in ſome ſorts of living Creatures. An example of theſe we have in the Echeneis, Remora or Stop-ſhip, a Fiſh ſo called, whoſe ſtrange force (as others, ſo) *Pliny* admires in *lib. 32. cap. 1. Let winds blow* (ſaies he) *and the ſtorms rage, a very little Fiſh maſters their fury, and bridles all their ſtrength, forcing the Ships to ſtand ſtill in the Sea; which no Cables could do, no maſſie Anchors. It curbs the violence, and tames the rage of the wind without any pains to it ſelf, not by holding the Ship, nor by any other way than ſticking to the ſame. This little Creature is ſo powerful againſt all the ſtrength of wind and Tide, as to ſtop the Ships in their way. But Armed Fleets have Towers built upon them that they might fight in the Sea as from a City wall. Alas for the vanity of Man-kind! when a little Fiſh half a foot long can arreſt and hold in bondage their Men of War armed for the Fight with Braſs and Iron.* So far *Pliny*. And this is performed by the ſaid Fiſh only when it is alive. Alſo 'tis wel known what force the Torpedo hath, viz. How it does not only benum thoſe that touch it, but it ſtupefies the hands of Fiſher-men through the Net it ſelf. And ſome relate when it ſwims away alive, if a man ſtir the Water with his hand it nums his hand. And yet being dead the ſaid Fiſh is Food for ſome People. How admirable the forces of a live Baſilisk are may be ſeen in our *Epitomy of Natural Philoſophy*, Book 7. Chap. 10. yet being dead it may be handled without danger. Such Qualities are rightly derived from the Forms of Animals, concerning the Original whereof we have ſpoken elſwhere more largely, viz. how at the firſt Creation they were all created with Plants and Animals, and are now multiplied in the generation of Plants and living things, and have their Faculties implanted by the Creator.

Individual Properties

Secondly, There are ſome individual Proprieties in living Creatures. So ſome perſons cannot abide Cheeſe, this or that Fiſh, or other meat or drink; and Authors every where obſerve ſundry ſympathies and Antipathies of ſundry Creatures individual. Theſe Properties (ſince they are not common to the whol kind, but proper to ſome Individuals) do not ariſe from the ſpecifical form, nor do they belong to the Eſſential faculties which flow immediately from the Form, and like the Form it ſelf are immutable and incapable of degrees; ſuch as is in Man the Faculty of Reaſoning, Laughing, Seeing, Hearing, &c. But to Natural Powers and Impotencies they are to be referred, which flow from a peculiar diſpoſition of the Body, or its parts. Which diſpoſition ſince it is not eſſential to a Man, but variouſly mutable, a Natural Power, and a Natural Impotency, may be changed one into another: for examples ſake, It is the Property of a Man among other things, to deſire, digeſt, and be able to turn meats good for his Body into nouriſhment. But in that ſome cannot away with Cheeſe, others with a Pike-fiſh, others with Wine, that ſprings from a Natural Impotency ariſing from a peculiar diſpoſition of the ſtomach in this or that man: which being not alwaies perpetual (but ſometimes in progreſs of years, or for other cauſes it is changed) it many times fals out that he who in his Child-hood could not abide Cheeſe, nor to drink Wine, afterwards being grown up to mans eſtate he can away with both Wine and Cheeſe. Now whereas to Natural Impotencies do belong al thoſe things which belong to any ſickly conſti-

tution; those occult Qualities depend not upon distemper, or any Organink Disease, or of Solution of Unity, but upon an hidden an unexplicable dispositon. Indeed for a Man not to be able to desire to eat, nor to concoct his meat, may proceed from a manifest distemper of the stomach: but that he who can eat and digest al other meats, only should not endure Cheese, or Bread, or this or that sort of Flesh or Fish; this comes meerly from an Occult Quality. Now these dispositions are somtimes born with the party, and somtimes they happen afterwards. Of those which are born with the Party, some are Hereditary, which being before in the Parents, are derived into the Child with the Principles themselves of Generation: but others, though they were not in the Parents, yet are they imprinted on the Child by the imagination of the Mother; whence it comes to pass that Children cannot endure such meats as either their Mothers loathed when they were with Child, or which they longed for, and could not obtain. After Birth they are somtimes caused by loathing of some meat too often and too plentifully eaten. In which case the power of the Imagination commonly bears the greatest sway, of which I have treated in my Book of the *Consent and Dissent of the Chymists and Galenists, &c. chap.* 14.

Of the Occult Qualities of Jewels, Stones, & Metals.

The third kind of Occult Qualities is of things which do not live, but have nevertheless their specifick Forms, differing from the Forms of the Elements. So, by Reason of its Specifick Form the Load-stone draws Iron. And the several precious Stones, as also Metals and Minerals, have their Occult Properties and Faculties, which flow from their Specifick Forms; which Specifick Forms nevertheless (as al others) do lie concealed from the knowledg of Man.

Occult Qualities of dead things.

Fourthly, There are Occult Proprieties in Natural things which have formerly lived but now do not live any more. Such as are every where to be seen in Plants and Animals, which we use instead of Physick. For we use not ordinarily living Plants or Animals, but only such as are dead. So we use dried Toads to draw out Poyson: the ashes of River-crabs or Cray-fish cures the biting of a mad Dog: the Horns and Hoof of an Elk are good against the Falling-sickness: Harts-horn and the Bone taken out of an Harts Heart, are used against Poysons: Mans Skul cures the Falling-sickness: Rhubarb, Agarick, Mechoacan, white and black Hellebore, and other Plants, have a purging faculty: Peony Roots are good against the Falling-sickness: Scordium is good against Poyson: and there are very many more rare Vertues of Plants. And to this Tribe in a word belong the Vertues and Hidden Properties which are sought for in Plants and Animals after they are dead.

Whence they proceed.

Now certain it is, That these Occult Properties do not flow immediately from the Soul and Specifick Form of Animals or Plants; since the Soul is no longer in those Medicaments. Nor can they proceed from the Mixture of the Elements simply, and the temper of the first Qualities; since their actions are of a quite different kind from them, and above their activities, nor are they directed by the Soul, as being no longer present. And since every Quality pre-supposes a Form, these Qualities must also of necessity flow from, and depend on some Form. Now that can be no other than that which was before the subject of the more noble perfect and specifick Form, after its manner, and as far as belonged thereto. I say, after its manner, lest any should have occasion to quarrel. For that Form with its matter does not quite make up the ultimate subject, which is corrupted with the Form it self, or at least does not constitute a perfect Organ; since in Animals there is also required an influent Heat, and in Plants somwhat which holds proportion thereto. For seeing the more noble Form requires the more noble Matter, and as Forms differ in nobility or baseness, so also those matters differ, and are proper to several sorts and forms of things: the difference and diversity of those matters cannot come but from different Forms which constitute the proper subject of every Specifick Form. Which Forms (truly) considered by themselves are also true Forms, which do inform their Matters; but in respect of the Soul and Specifick Form they have the Nature of an immediate matter; and so one thing does not subsist by two substantial acts, but each hath one specifick Form. Now when the Specifick Form goes away, these Forms remain a while after, and perform the Office of Forms, and are the Authors of those Faculties which are found in many things after they are dead, but such as 'tis impossible they should proceed from the Qualities or Forms of the Elements.

Whence the subordinate Forms proceed.

Now what the Original of these Forms should be, is a Question hard enough, and few have enquired thereinto. And because I have spoke largely thereof in my *Institutions of Physick, Book* 5. *part* 1. *Sect.* 1. *ch.*2. I wil but briefly touch the same in this place. The most wise Creator, as he gave in the first Creation to al things their specifick Forms, so also he gave them different matters, to each a proper one, and in that matter also certain Forms proper

proper to every Species; and that for two intents: First that the ſpecifick Forms might have ſubjects wherein to be, ſubſiſt, and perform their actions. Secondly, That when the Soul or Specifick Form is gone, they might be uſeful to Man as Food or Phyſick. And as thoſe Specifick Forms are multiplied and propagated; ſo alſo theſe ſubordinate Forms are propagated. Or at leaſt (which I ſee is the Opinion of ſome others) the Souls of living things have an ability to produce ſuch Forms as are neceſſary to conſtitute their ſubject place or Manſion-houſe, which alſo may remain when they are gone. *The end of thoſe Forms.*

And foraſmuch as every Form requires its Subject and adequate Matter with which it is, and periſhes therewith, it is worth our Labor to enquire of the Subject of theſe Forms. Now this in Plants and Animals ſeems to be no other than that ſame implanted Spirit and Radical Moiſture which joyntly are called commonly Native Heat, and by late Writers (eſpecially Chymiſts) Natural Balſam. For Experience it ſelf teaches, That Plants and the parts of Animals, ſo long as they retain that Balſamick Subſtance, do preſerve their vertues entire: but as ſoon as they loſe the ſame, and become rotten or putrefied, they loſe alſo their vertues, ſo that the remaining Body becomes unprofitable. Which the Operations of Chymiſts and Apothecaries do ſhew. For if by boyling or ſteeping that part of the ſubſtance be ſeparated and extracted, wherein is the Purgative Faculty, an uſeful Medicament is made; and the remaining Body becomes quite ineffectual. *The ſubject of theſe forms.*

Fiftly, There are occult or hidden Qualities in ſuch things as are Naturally bred in Plants and Animals; ſuch as are the Poyſon of a Scorpion, an Aſp, an Adder, the Spider *Tarantula*, and other venemous Beaſts; Bezoar ſtone, Musk, Civet, Caſtoreum, and whatever other things there are of like kind Naturally bred in Animals. Hither are to be referred the juyces of Plants, their Tears and Gums, as Aloes, Scammony, Elaterium, Euphorbium, *Gambugia*, Opium, juyce of Hemlock, and many more of this kind. All which though they are to Men in place of Medicament or Poyſon, yet are they Natural and kindly to their reſpective Plants and Animals. Now al ſuch Qualities and their effects do not proceed immediately from the Soul or Specifick Form of thoſe living things, but from their own proper Form; ſince being ſeparated from the living things, they have nevertheleſs their effects and operations. Now whence theſe Forms proceed, though it is not very eaſie to declare; yet it ſeems moſt ſafe to hold, That thoſe things receive the ſaid Forms from their own Souls, and that thoſe Forms are ſome way included in the Souls, or at leaſt proceed from them. For as the ſoul hath a power to make Chyle, to make bones, and to make skin; even ſo other Juyces are produced in other living things, as Oyl in the Olive Tree, Wine in the Vine; and after the ſame manner thoſe Medicinal and venemous juyces aforeſaid are produced by the Soul proper to their reſpective kind. And as Wine though no longer animated with the Soul of the Vine, yet retains many yeers that ſame form which it received from the Vine as a Body Natural; ſo the juyces lately mentioned do long retain their Forms and Vertues entire; yea, and they have ſome affinity to, and correſpondence (as it were) with the forms of that kind, and perform motions anſwerable to their motions. Whence it is that Wine in the Hogshead is wont to work when the Vines do bloſſom. For the reaſon of all ſuch things lies concealed in the ſeed; becauſe (as *Ariſtotle*, 5. *de Gen. anim. cap.* 7. ſaies) Principles of things though ſmal in Bulk, yet are exceeding great in faculty and power, which is eſpecially true of the ſeed; and what *Seneca* ſaid excellently, *Lib.* 3. *quæſt. nat. cap.* 29. concerning Man, is true of al other living things. In the ſeed (ſaies he) *is contained all the Nature of the future man; the Infant not born hath in it the Principles of a beard, and of Gray Hairs.* *Occult qualities in things which are naturally bred in Plants & Animals.*

In the ſixt place, are malignant Humors and Poyſons, which are preternaturally bred in the bodies of Animals, and do al operate by hidden Qualities. Such are thoſe Humors whence the Falling-ſickneſs, Mother-fits, Malignant Dyſenteries, Malignant and peſtilential Feavers, yea, the Plague it ſelf, the Scurvy, the Leproſie, are generated; alſo the poyſon of a Mad Dog. Of the Generation whereof we have treated in our *ſixt Book of Practice, part the ſecond.* *Occult qualities of things preternaturally bred in the Bodies of Animals.*

Chap. 4. *Of the Difference of Occult Qualities.*

NOw Occult Qualities are not of one kind, and the firſt difference appears from what hath been ſaid in the foregoing Chapter, by which it is manifeſt that there are ſix kinds of them in reference to their Original, touching which 'tis needleſs to add any more. *The differences of occult qualities.*

In the ſecond place, There is another difference drawn from the manner of inhering. Vulgarly, as alſo it appears from *Scaliger*, *Exercit.* 71. they ſay ſome Qualities are real, others

others intentional. The greenness on the Tree they say is a real Quality, the greenness cast by the Tree upon a wall, or on a mans cloaths, is an intentional Quality: the color of a Glass of Claret is a real Quality, the redness thereby caused upon the Table-cloath is an intentional quality, the light shining through the Glass of Wine. Where the thing it self is truly declared, but the names are not convenient. For since that is properly termed intentional which depends upon the operation of our mind, and is nothing without the same: after this manner these Occult Qualities cannot be termed intentional, nor are rightly opposed to real Qualities, since they themselves are also real, and are found in Nature when we think not of them, and have real effects. I conceive the color in the Tree, and the Wine in the Glass should be more rightly called material qualities, seeing they are not separated from the Matter; but the other Spiritual Species or representations. And there is no smal difference betwixt those material qualities, and these Spiritual Species. For the former are in their Subject, and are moved with it, and according to its motion, nor are separable therefrom, and are successively received in their Subject, nor are they divers differing in number in the same Subject, not confused but distinct. But those Spiritual Species are diffused from the Body whence they arise round about in a right line like Raies, nor are moved with the air wherein they are; in the same Subject they are many in number, not confused, as appears by the sundry shadows made by several Candles; also many of them pass through solid Bodies, as appears by sounds, and the vertue of the Load-stone. Nor are they ineffectual, but have in them the vertues of those things from which they flow; as Shine represents the Light; the Load-stone draws Iron, the shadow of the Eugh-tree is hurtful. And although these Species are commonly reckoned only amongst Sensible Species; yet doubtless there are many more of them than are discerned by Humane Senses. And by means of them many Sympathies and Antipathies of things do happen, and wonderful actions and operations, which are by some termed Magnetical. Which very thing *Jul. Cæs. Scaliger* acknowledgeth, who in *Exercit.* 344. *Sect.* 5. where he speaks of Sympathy, at last concludes, That such things are done by Species, and that those Species are like a continual Ray promoted, which is propagated through and beyond the Body of the Glass.

Material Qualities and spiritual species, how they differ.

What spiritual species are.

But what these Spiritual Species are is not easie to say. They are commonly called Qualities; but this term likes not *Fracastorius*, *Lib. de Sympath. & Antip. cap.* 5. who holds that they are Substances, and of the same nature with those Forms whose Species they are, not differing from them save in their manner of subsisting. For so far he saies they are Material, because they are in the matter by a certain gross existence, and require certain limits. And since it is the innate property of al Forms to propagate themselves, and these material Forms cannot propagate themselves after their own manner of existence, they produce a thin and Superficial part or degree of themselves, which they term *Epipole*, which by reason of its tenuity both hath no contrary, and is bred and propagated in a moment, as a kind of Brood. But hardly wil any man say, That the Light and Shine of the Sun are of the same Essence one with another, much less that they are of the same Nature with the Suns Form; or the color in a thing with that in its Image in a Looking-glass. But how (in case they are Qualities) they should be generated in a moment and propagated, not moved with the Air through which they are diffused, and that divers in number of the same sort should be in the same Air unconfounded or jumbled together, there is hardly any man can well tell.

For the same obscurity we meet with in the sensible Species of Nature, we find also in all other her Spiritual Species, which are many more than can be discerned by our Senses, or is commonly believed.

Occult material Qualities.

According to this Difference of Qualities Occult Qualities also differ. For first there are Occult Qualities which may be termed Material because they are alwaies propagated with the Matter and Subject wherein they are generated, and do not diffuse themselves without the same. And though they may seem to diffuse themselves into other bodies, and afar off; yet that is done by Atomes and their smallest Corporeal Particles, which differ from the Bodies from whence they flow only in Magnitude, and have the same Essence, Qualities, and Faculties with them. Such are al those Occult Qualities by which contagious Diseases are conveighed into other persons, as is seen in the Venereal Disease, the Leprosie, Pestilential and Contagious Feavers, and the Plague it self. For in al such Diseases certain very smal particles flow from the sick body, which being received by other bodies they raise in them the same Disease; as I have shewed at large in the *Second of my Institutions, part* 2. *cap.* 12. and my *Fourth Book of Feavers, Chap.* 3. and my *Sixt Book of Practice, p.* 3. *cap.* 3.

cap. 3. For these are not Species carried right on as a Ray, but little Particles or smal Bodies which are themselves disorderly moved by the motion of the Air: nor is any man infected either with the Plague, Venereal Pox, or Leprosie, unless he receive into his Body some of those foresaid Particles or smal Bodies.

Spiritual Qualities.

Again, There are Occult Qualities which are justly termed spiritual Species, because they pass from their Body like a Ray continually thrust forward, being circularly diffused, and have a certain Sphere of their activity, and some of them do also pierce through other Bodies. So a Load-stone draws Iron though a Board be betwixt them: a Cat shut up in a chest can affect a Man that hath an Antipathy against Cats; the Dog through the shut door by vertue of these Qualities knows his Master to be there; the *Torpedo* benums the Fishermans hand through the staff of an Eel-spear. And *Avicenna* and the Conciliator in *Lib.* 1. *de Venen. cap.* 1. speak of a Serpent who infected and killed a Soldier through a Spear, with the end whereof he touched it. So the Basilisk or Cockatrice kils a Man by looking on him. Which things the foresaid Qualities adhering in the matter cannot do. Nor can a Man sick of a contagious Disease infect another through the door (being shut) since those smal bodies cannot pierce the boards.

The third difference of Occult qualities.

Thirdly, There is yet another Difference of Occult Qualities observed as yet by very few, viz. There are some Spiritual Qualities which flow from other things, are received in some Bodies, and being received in them they have the same Faculty as the others. Such a like thing is observed in the Load-stone. For the Vertue thereof is received by Iron, whereupon the Iron also gains the faculty of drawing Iron, and moving to the Poles. Nor is this only done by rubbing upon the Load-stone, and the communication of certain Atomes; seeing Iron shut up and covered wil receive vertue from the Load-stone, which I my self have observed. For having once an Ivory-cover'd Sun-Dial made with a touched Needle, in the same case of box with a greater Load-stone, the Needle of the Sun-dial quite changed its faculty of turning to the Poles, and was moved with a new kind of motion. So Dogs follow their Masters, and they hunt the Beasts by the track of their feet, such species being doubtless printed upon the Earth and Grass which they perceive by their smelling faculty. For it must needs be some real thing that works upon their Smel, and yet not a material quality, which with its smal bodies hath no fixed mansion, but is inordinately moved with the motion of the Air. And I am confirmed in my Opinion by *Nicolas Cabeus*, in *Lib.* 3. of his *Magnetick Philosophy, cap.* 21. where he informs us, That Iron attains its verticity or a faculty of turning towards the Poles, not only by touching the Load-stone, but by being near the same also. Take (saies he) a Needle which hath never touched a Load-stone, and hang it up by a thred, then hold it towards the Load-stone, but so that it may move towards the Load-stone, but not touch the same, nay, that it may be a pretty distance therefrom; I say, it will so come to pass, that the Needle shal receive vertue from the Load-stone not only by touching it, but also by approaching the same without touching: yea, it would derive into it self the vertue of the Load-stone, although some other Body were interposed betwixt the Needle and the Load-stone, as Wood, Stone, or any other. This appears first by experience. For if (as I said) the Needle be hung up so far off, that it aspires indeed to touch the Load-stone, but cannot do it, either because it is held afar off, or because some other Body is interposed betwixt it and the Load-stone; If afterward you take away the Load-stone the hanging Needle wil shew al the magnetical Effects most clearly, which before it did not shew, even as if it had touched the Load-stone. For ballanced it will turn to the Poles, its point looking alwaies to the North, according to the magnetick Laws, and it wil draw filed Iron; so that try it which way you will, it wil continually most clearly evidence its magnetick Vertue, which did not appear before it had so made its approaches to the Load-stone. Therefore the Load-stone conveighs its Verticity and Vertue into the Iron not only by touching the same, but by its presence alone if it come but near the same. Moreover, this is also apparent by Reason. For the Loadstone hath not only in it self a Magnetical Vertue, and consequently a Faculty in it self to produce the same in Bodies having affinity thereto, but it also sheds forth round about the said Vertue, and forms to it self a Sphere of activity. And many other such like Species there are (doubtless) which pierce as easily through the most solid Bodies, as through the thinnest Air. So far *Cabeus*.

Now such Qualities are received in any Body agreeable thereto. So the magnetick Quality is received in the most pure Iron. Also the same *Cabeus* writes, it is received in those Bricks which through vehement burning have gained the color of Iron, and are therefore either from their color or hardness called Iron Bricks. *Lib.* 2. *Philosoph. Magnet.*

Magnet. Cap. 8. and if you take a bit of such a Brick, and touch it artificially upon a strong Load-stone, it receives (he saies) the Quality of turning to the two Poles of the World.

The fourth Difference. Fourthly, Occult Qualities are also distinguished in respect to their effects, in regard some cause Sympathy, others Antipathy, examples whereof are every where to be seen in Nature, and they are collected by *Fracastorius* in his Book *de Sympathia & Antip.* Marcellus Donatus, *de Histor. Med. mirabil.* Johan. Francisc. Ulmus, *de Occult. in art. med. proprietat.* Andreus Libavius, *part* 2. *singul. tr.* 4. Johannes Schenckius, *Lib.* 7. *Observ. in fine.* which I think needless to repeat in this place.

The fift difference. Fiftly, There is a certain difference which *Galen* reckons up, 6. *Epidem. com.* 6. *text.* 6. where he divides things which work by Propriety of their whol substance into four kinds; Aliments, Medicaments, Poysons, and Antidotes, wherein are comprehended al things in Nature, Minerals, Stones, Plants, Living things. And as to Aliments or Foods, of necessity some likeness there must be and sympathy between the Food and that which is nourished thereby; which consists not only in the first Qualities, and their Temperament, but also in the whol substance and occult qualities; which even hereby appears, in that there is not one Aliment of al living things, but sundry Aliments. For several Plants growing in the same Field do each draw its own proper Aliment, and as *Hippocrates* writes, *Things that grow and are sown, when they come into the ground, each draws that which it finds in the Earth suitable to its Nature. Now that is sowr, and bitter, and sweet, and salt, and all kinds of Juyces.* And the same holds in Animals. For such things as are poyson to a Man are food to some Creatures; as Hellebore to the Quail, Hemlock to the Starling, Frogs, Snakes, Toads to the Storks. Yea, and some men delight in some kinds of Meats, and abhor other some.

Occult quality of Aliments.

The quality of occult Medicaments. Now it is a thing not to be doubted that most of the Vertues of Medicaments proceed from occult Qualities. Purgatives exercise their Operations by occult Qualities. And so do specifical Medicaments, and those which are proper to several parts of the Body; also Amulets, and al things that help or hurt the Body, externally applied. Hitherto pertain Smels, Fumigations, and those hidden steams which work upon Man and Beast; as it is very wel known how Dogs follow their Masters and wild beasts footing by the scent; and some cannot endure a Cat in the room though they see it not, as was said before: not to speak now of such things as mutually work one upon another by seeing and hearing. Of al which *Johannes Francisc. Ulmus* brings many examples in his whol Third Book *de Occult. in arte Medica Proprietat.*

The Occult qualities of Venoms. And touching Poysons, it is so manifest that they act by occult Qualities, that *Julius Cæsar Scaliger* writes wel in *Exercit.* 218. *Sect.* 8. If nothing else could perswade us how vainly and rashly many endeavor to reduce al things to manifest Qualities, at least poysons and their Remedies might teach us so much.

Of Antidotes. And the same may be said of Antidotes, seeing they are opposed to Poysons, and therefore as Poysons are hurtful to our body, not by manifest, but by Hidden Qualities; so are these also contrary to Poysons, not by manifest, but by Hidden Qualities.

And whoever shal observe what hath been here said in general of Occult Qualities, he may with little difficulty understand such things as he shal meet with in the Writings of Natural Philosophers and Physitians concerning the said Qualities.

THE

a Pouder: give hereof a dram at once, with the Syrup of Sorrel.

Some there be likewise that commend the Water of Nuts.

They commonly administer one dram of *Sperma Ceti* dissolved in Vinegar, or some fit and convenient Water.

There are likewise some that make use of Unguents, and that with good success also; which are likewise taken into the Body, and are therefore stiled Potable; as for instance, the Potable red Unguent of the *Ausburg* Practitioners. Or,

Take *Green Sanicle four ounces*; *the Leaves of Betony, Fennel seed, Juniper Berries unripe, of each three ounces*; *the Root of Elecampane, of the greater Comfrey, Rue, Ground Ivy, Rosemary, Rhapontick root, of each two ounces*: *all these being shred very smal, let them be stirred about and incorporated with three pound of fresh Butter*: *Set them then in the Sun for eight daies: afterward put thereinto one Cyath or little Cup ful (about two ounces) of Sanicle Water*; *then boyl it til the water and juyces be quite consumed*; *and then let the Butter thus incorporated and moistened with the Juyces be pressed forth, and kept for use.* The Dose is half an ounce twice a day, to be taken with warm Beer; the place affected may likewise be outwardly anointed with the same, yet not at the first beginning and appearance of the distemper, but some while after. Or,

Take these Herbs, *Wormwood, Southernwood, of each two handfuls*: *the Herb Ladies Mantle, Motherwort or Mugwort, the lesser Comfrey, the lesser Sage, Germander, the lesser Centaury, Crosswort, Fennel, Strawberries, Fenugreek, Ground Ivy or Alehoof, Hyssop, Lavender, Milfoyl, Marjoram, Balm, Bugle, Pennyroyal, Pyrole or Winter green, Pimpernel, Rosemary, Sage, Sanicle, Savory, Spicknard, Betony, Vervain, of each one handful*; *the roots of Marsh-mallows, Clove-gilliflowers, the greater Consound, Angelica, Pimpernel, and Tormentil, of each of these one ounce.* These Herbs and Roots gathered green in the month of *May* or *June*, boyl in six pound of *May Butter*; adding thereto as much *Wine* as you judg sufficient: let them boyl together, until they be boyled enough, stil taking heed that they burn not to; and in the end adding of the Oyl of Bayes fresh and new, four ounces; *Sperma Ceti* half a pound; Make herewith an Unguent of a green color: the Dose is one ounce, in Vinegar or Beer; and this may likewise be outwardly applied unto Wounds. Or,

Take *the Roots of Tormentil, Dittany, Sanicle, the greater Consound, Consound Sarracen, of each two ounces*; *Castoreum one ounce* (that sort of it that is offensive by reason of its unpleasing tast may be omitted) *Madder three ounces*; *May Butter three pound*; *red Wine as much as will suffice*: *mingle and boyl them till the Wine be consumed*; *herewith make an Unguent*; *adding thereto of Sperma Ceti one ounce.*

As for the Topicks, at the first beginning some Astringents are to be mingled with the discussive Medicaments. For when the Tunicles of the Veins (out of which the blood is poured forth) are somwhat bruised, they ought then to be a little strained together, bound fast, and condensed, lest that the new matter drawn thither by pain be poured forth; since that if in the beginning only Digestives be administred, they wil not only discuss the blood poured forth of the Veins, but attract and draw unto the part that blood that is in the bruised smal Veins. Afterward, that the little contused or bruised Veins may return unto their Natural state, Digestives alone are to be made use of. For this end and purpose, some there be (now this indeed is the best kind of Remedy especially for those that are beaten) that wrap about the sick person the Skin of a Ram new flaid off, and whilst it is yet hot, besprinkled with Salt, Myrtle Berries, and the Pouder of Water-Cresses; or if such a skin may not conveniently be gotten, they anoint the Patient with the Oyl of Roses, of Myrtles, and of Earthworms, with which they mingle the Pouder of red Roses, or Myrtle Berries; and the day following such a like Liniment may be administred;

Take *Unguent Dialthæa three ounces*; *Oyl of Earthworms, Camomil, and Dill, of each one ounce*; *Turpentine two ounces*; *the meal of Fenugreek, the pouder of red Roses, and Myrtles, of each half an ounce*; *Saffron one scruple*: *make a Liniment, or an Unguent with a sufficient quantity of Wax.*

If there be any particular Contusion, such a like Liniment may at the first be administred;

Take *Oyl of Roses, of Myrtles, of Camomil, of each one ounce*; *the white of one Egg*; *the pouder of Myrtles and Roses, of each two drams*: *mingle, &c.*

After this, on the third day, let the part affected be fomented with the Decoction of Camomile, Wormwood, and Cummin.

The next following Liniment may likewise be administred. But now in the curing of the Suggillation the most efficacious Remedy is the Root of the Herb *Sigillum Solomonis*, or Solomons Seal; which either new gathered, or else in the Winter season macerated in Wine, and bruised, and then applied in the form of a Cataplasm oftentimes in one only night wholly taketh away the Suggillation, so that the Native heat returneth unto the part affected. Or,

Take *the Roots of both the Consounds, of each three ounces*; *Camomil and Melilot flowers, of each two smal handfuls*; *the meal of Barley, Fenugreek, and Beans, of each one ounce*; *the pouder of Wormwood, half an ounce*; *Cummin seed one dram*; *Saffron half a scruple*:

Mingle them, and make a Decoction for a Cataplasm.

There is likewise commended a musty or mouldy Nut bruised, Reddish Seed, with dried Figgs; Mustard Seed with Vinegar, Rue with Honey. Or,

Take *the Root of Wake-Robin or Cuckowpint while it is green, an ounce and half; Solomons Seal four ounces; these Roots being shred smal, pour upon them the water of Elder flowers, white Lillies, and Bean flowers, of each four ounces, Wine Vinegar two ounces, Alom six drams, one Gall of a Bull; let them stand and digest for the space of eight daies, and every day during that time let them be well shaken together.*

In this Water let Linen Cloaths be well soaked, and so applied unto the part affected. Or,

Take *Pigeons Blood, Cummin, Camomile, of each one dram; the meal of Fenugreek, half a dram; Celtick Spikenard one scruple, Malmsey as much as is sufficient; make a Liniment.*

In special, in a Swelling (especially if there be a Leaden and wan colour after Venesection) there may be fitly applied the Oyl of Rue, and the Leaves of common Rue, boyled in common Oyl imposed upon the place affected.

But if the Malady be not remedied by these medicaments, neither the blood that is shed forth without the Vessels may by them be dispersed, then if the place wil bear it, Cupping-glasses are to be administred; which are the most effectual Remedy for the extracting of whatsoever is conteined in a deep place; and moreover if need require, Scarifications are also to be made use of, that some of the Blood may manifestly be evacuated and emptied forth.

But now if by all these there cannot be made that Resolution of the Blood that ought to be, and withal if there be present any tokens and signs of a suppuration, as for example, if the place swel up a little and appear soft to the touch; if there be a certain beating pain, and a redness begin to appear round about, then the suppuration (in the common and received Opinion and Judgment of Chirurgeons) is to be holpen on and by all means to be furthered. The Suppuration being thus finished and wrought, the Ulcer is then to be purged and cleansed, filled up with Flesh, and at length closed up with a Cicatrice. Yet notwithstanding in the use of these suppuratives great caution is to be had; and of these only such as are gentle, mild, and moderate, are to be administred. For if there be any error committed in the use of these, and that we be not extraordinary carefull in this point, there may easily be excited in the part a sordid and filthy Ulcer, and a putridness withal. When therfore some of the latter Chirurgeons & those of our time wel consider the Premises, and what we have said, they advise, that when we perceive that the Contusion is converted and turn'd into an Impostume, a perfect suppuration is not then to be expected. For if the *Pus* or purulent matter that is generated from the congealed and clotted blood be any long time detained and kept in the place affected, it may then excite and cause many evils, as Feavers, pains, and an extraordinary putridness; and may likewise corrupt the neer neighboring parts, the Nerves, and the Bones; whereupon afterward Ulcers of dangerous consequence, and Fistulaes also even from hence oftentimes take their Original. Neither likewise do these admit of any Emollient and suppurating Emplasters and Cataplasms; in regard that by these a putridness, and those other evils and mischiefs that are wont from thence to arise, may easily be excited in the part. But they counsel and advise us rather that such a place wherein there is contained any clotted blood (which now exciteth the Apostem) be forthwith opened with a Pen-knife; and that in the Wound made by Incision there be conveyed in a Tent anointed with Unguent Ægyptiack; and that the whol place be wel fenced and covered with some fit and convenient Emplaster that may preserve the Native heat thereof, and defend it from putridness. And this they conceive is more especially to be observed, if the contusion be made in the Sides, the Belly, or the Back. For then there is diligent heed to be taken, whether or no on the third, fourth, or fifth day (in that place wherein the Contusion or bruising happened) there arise any Swelling with a pain, and thenceforth from day to day encrease; and whether or no there be a beating pain excited; and that the sick Person cannot wel endure that the said place be touched; and whether there be another kind of redness appearing in the Circumference; and whether the breathing be difficult; and some kind of preternatural heat discovering it self in the Body. For wherever these things appear, (albeit there be appearing no wanness or Leaden colour in the external parts) it is a sign and token that the *Pus* or corrupt filth is gotten together, and that the Impostume is excited. Whereupon (left that the *Pus* convert it self unto the more inward parts, and there raise as it were Conny-burrows (for so they term them) and gnawing asunder eat through the more inward parts, and so by this means hasten upon the sick Party a sudden Death, or long continuing Diseases, the the place is speedily to be opened; for the place being thus opened, the *Pus* very easily issueth forth. Let the Wound be afterward handled and ordered as we said before; and herein we must not neglect or omit Venesection, and Vulnerary Potions; but they conceive that there is scarcely any, or at least very little benefit arising and accrewing to the Patient from Emollients and Suppuratives.

But

But if the Contuſion be great, or that any error hath been committed in the Cure, or that the place begin to look black and blewiſh, and to be mortified (by reaſon of the ſuffocation of the Native heat, ſo that a Gangrene and Mortification be feared, as like to enſue) then in the firſt place Scarification is to be adminiſtred; or likewiſe, if need ſo require, Cupping-glaſſes are to be applied, that ſo the corrupt blood may be evacuated. After this the part is to be fomented with warm Vinegar, or the Decoction made of the Reddiſh Root, of *Serpentaria* or Vipers Graſs, Cuckowpint, Solomons Seal, and Wine as much as will ſuffice. For ſuch like Remedies diſſolve the clotted blood, and draw it forth from the very bottom unto the outmoſt part of the Skin. And after let there be applied the Diachylon-Flower-de-luce Emplaſter. Or,

Take *Southernwood, Cumin Seed, Camomile Flowers, of each one dram; the Juyce of Wake-robbin or Cuckowpint as much as will ſuffice; make hereof a Cataplaſm.* Or,

Take *Oyl an ounce and half, Wax an ounce, the Juyce of Marjoram an ounce and half; let them diſſolve together at the Fire, and then add of the Spirit of Wine one ounce.*

And to conclude, that which *Paræus* adviſeth is to be taken notice of; to wit, that in the contuſion of the Muſcles (and eſpecially thoſe about the Ribs) the Fleſh a little ſwelleth up, and becometh as it were ſnotty and purulent; inſomuch that if it be preſſed down and ſqueezed together it ſendeth forth a flatulent Air, with a certain kind of low noyſe and gentle hiſſing, and withall the print and impreſſion of the Fingers remaineth, and is to be ſeen for ſome while after. And thereupon (in that void ſpace that the Fleſh ſeparating it ſelf from the Bones hath left) there is a purulent and rotten filth gathered together, by which there is cauſed a ſyderation and putrefaction. If therfore this ſhal happen, the Malady is ſpeedily to be taken in hand, the beſt means uſed, and the part moſt ſtrictly and cloſely to be drawn together; and furthermore, *Oxycroceum* or *Ireat Diachylon*, or the like Digeſtives are to be adminiſtred.

And thus much ſhall ſuffice to have been ſpoken touching Tumors ariſing from the Blood; there now follow thoſe Tumors that ariſe and proceed from Choler.

Chap. 17. *Of the Tumor* Herpes.

HAving hitherto treated of and explained the Tumors ariſing from the blood; it now remaineth in the next place, that we likewiſe explain and declare thoſe Tumors that proceed from Choler. Among the which the *Eryſipelas* is commonly wont to be firſt propounded and reckoned up. But ſince that, as we conceive, the *Eryſipelas* (as it is now adaies with us) or as it hath been by the Ancients vulgarly termed, *Roſa*, may more fitly be recounted among the Tumors ariſing from the blood; we have therefore treated thereof above, among the Tumors proceeding from blood, in the ſeventh Chapter; where we handle the *Eryſipelas*.

But now *Herpes* is truly and properly a Tumor proceeding and taking its original from Choler. And it is termed *Herpes* from its creeping; to wit, becauſe it ſeemeth to creep like unto a Snake; and for this reaſon, becauſe that no ſooner doth one part ſeem to be healed and wel, but the Diſeaſe inſtantly creepeth unto the next adjoyning parts. And although (to ſpeak truly) there are very many Maladies that Creep along; yet in ſpecial, that Tumor is by Phyſitians termed *Herpes* that is excited in the ſuperficies of any part (from yellow choler ſincere or ſimple, that is, ſevered from all other humors) and from thence creepeth along unto the parts next adjoyning. For as the *Eryſipelas* ariſeth from blood very thin and cholerick; ſo the *Herpes* proceedeth from excrementitious Choler. *Celſus* ſeemeth to propound and mention *Herpes* under the name and notion of *Ignis Sacer*, or the Sacred Fire: whereas other Latine Phyſitians underſtand an *Eryſipelas* under this appellation of *Ignis Sacer*.

The Cauſes.

The conteining Cauſe of *Herpes* being ſincere, pure, and ſharp Choler, ſevered and ſeparated from the reſt of the humors; which by its implanted thinneſs penetrateth and pierceth even unto the outward or Scarf-skin, and is by and through it diffuſed; it hence appeareth and by conſequence followeth that the Tumor or ſwelling in it is yet leſs than in an *Eryſipelas*. For as in an *Eryſipelas* the Swelling is leſs than in a *Phlegmone* by reaſon of the ſmal ſtore and thinneſs of the matter that is found in the one more, in the other leſs: ſo again in the *Herpes*, the ſwelling is leſs than in the *Eryſipelas*, for the very ſame cauſe. But as for the Antecedent and Procatartick Cauſes, they are almoſt the very ſame, as in an *Eryſipelas*; yet notwithſtanding ſomwhat more diſpoſed to the generating of an excrementitious yellow choler, then to the breeding of a cholerick Blood.

The Differences.

The Differences of *Herpes* are taken from the diverſity of the conteining Cauſe, and the humor: For although every *Herpes* hath its original from Choler and a thin humor; yet notwithſtanding, ſince there are certain degrees of its tenuity, thinneſs and purity; if that humor, or choler, be ſimple and of a thin ſubſtance, then the Affect that reteineth the general name is termed a ſimple or ſingle *Herpes*. But then if there be any portion of Flegm mingled therewith, there is produced an *Herpes* that cauſeth and raiſeth little Bladders in the Skin like unto the Miller, whereupon it is called *Herpes Miliaris*. And laſtly, if the Choler

be more sharp and biting, so that it eat through the skin unto which it adhereth, it is then termed *Herpes Esthiomenos*, that is, the eating *Herpes*; and this same by *Galen* (in his 14. Book of the Method of Physick, Chap. 17.) is called absolutely and only *Herpes*, and is almost of the same nature with an exulcerated *Erysipelas*; from which notwithstanding it differeth in the thinness of the humor. For so saith *Galen* in the place before alleadged: *It is* (saith he) *an exceeding thin humor that exciteth the* Herpes; *even so thin, that it doth not only pass through all the interior parts, which likewise are of a fleshy substance, but also the very Skin it self, even unto the utmost part of the Scarf-skin, the which alone (in regard that it is kept in and reteined by it) it both gnaweth, and likewise eateth through; whenas if it could also in like manner pass through it by sweating, it would not then excite and produce any Ulcer.* But now the exulcerated *Erysipelas* and the *Herpes Esthiomenos* differ likewise in this regard, that the exulcerated *Erysipelas* doth not only seiz upon the Skin, but also upon some part of the Flesh that is underneath it; but the *Herpes* exulcerateth only the Skin.

Signs Diagnostick.

In regard that the *Herpes* is apparent and manifest unto the Senses, it is therefore easily known. For it is a broad Tumor that hath little or no heighth in it; so that the part is scarcely lifted up at al; but may seem rather to be exasperated, then to swel up unto any heighth. There is moreover present to accompany it a certain kind of hardness, and a pain, and as it were a certain sense and feeling of an heat and burning. But the *Herpes Miliaris* hath divers smal Pustules like unto Millet, in the very top and outside of the Skin; of the which although some one or more of them be cured, yet notwithstanding there wil be still others arising; so that the Malady may seem by creeping still to move forward unto the adjacent parts: and if the Pustules be broken there will something that is of a quality and resemblance betwixt *Pus* and rotten dregs flow forth, the place it self will be very red; and oftentimes also it will have a middle colour, neither absolutely red, or pale, but between both. But then the *Herpes Esthiomenos* (or the *Herpes* that eateth through) is, when there appear many smal creeping Ulcers, and holes, which yet notwithstanding proceed not beyond the Skin; or, as *Celsus* (in his fifth Book Chap. 26.) writeth, *It is a Malady with an excoriation and exulceration of the highest and utmost Skin, without any heighth at all, broad, somwhat pale and wan, yet unequally, the middle whereof becometh whol and sound, when at the same time the extream parts thereof are in their progress and motion forward; and oftentimes that which seemed to be altogether whole and sound is again exulcerated; and the Skin that is next about it (which the Malady is even now ready to seiz upon) is somewhat more swoln and harder, and hath a Colour changing from Red to that which is dark and blackish.*

But, that we may likewise here give you to understand this, the more modern and late Physitians (whom we commonly stile Barbarous) almost all of them comprehend the *Herpes Miliaris* and the eating *Herpes* under the name of *Formica*, as being deceived either by the likeness of names, or else by Ignorance; whereas notwithstanding with the Grecians *Murmecia*, that is, *Formica*, is a certain kind of Warts.

Prognosticks.

1. The *Herpes* (albeit there be no danger in it, unless it be greatly exulcerated, and extreamly putrid) yet notwithstanding it is not easily cured; and usually the Disease is of a long continuance, unless there be (in the Cure) a due regard had unto the whol body.

2. Accordingly as the Choler from which the *Herpes* ariseth is more or less peccant and offensive, so likewise is the *Herpes* to be accounted more or less dangerous.

The Cure.

That so therfore the *Herpes* may be cured, there ought to be a due regard had unto the Cause Antecedent, and Continent, as also unto the part affected; and in the first place, and especially of the Antecedent. Since therefore that *Herpes* hath its original from yellow Choler and a salt humor, the said yellow Choler is first especially to be purged out of the Body; for unless the Body be purged, the sick Person wil never perfectly be cured and made sound. For although upon the applying of Topical Medicaments, in some one place the part may seem to be sound and wel; yet notwithstanding it soon breaketh forth again in another. If the matter be extraordinary thin (as it is evermore in *Herpes*) then Sudorificks ought likewise to have their due and proper place. But if there be any thing of Phlegm, or of the serous wheyish humor therewithall mingled, then some of those Medicaments that purge Flegm and Whey may therewith be mingled. The Diet likewise that is prescribed ought to be such as is fit and convenient where Choler and the adust humor offendeth.

Now when we have in the first place done what is requisite as to the Antecedent Cause, we are in the next place to take into consideration that very Cause that we call conteining. And therefore first of all, when there is in the Skin an extream and intense heat of Choler, then Coolers are to be administred, that may both extinguish the fervent heat of the Choler, and likewise repell and drive back moderately; such as are those Refrigerating Medicaments that are commonly wont to be administred in the *Erysipelas*; as for instance, Let-

tice,

tice, Knotgrass, and Navel-wort (which last some cal *Venus*-Navel, or Kidney-wort) and the like. After that the fervency of the heat is somwhat abated and qualified, that which remaineth behind is to be digested and dissipated by Medicaments that are rather of a drying Nature than such as moisten: as for example, Linseed boyled in Wine and Oyl, and the spume or froth of Silver. And these are more convenient in a simple heat. But now if Pustules shal chance to happen, because that they are somtimes broken and putrefie, (lest that there be excited in the part a putridness) those Refrigerating and Repelling Medicaments ought not to be cold and waterish, but cold and dry. And therefore in the first place, we are to make use of the yong Shoots of the Vines, the tops of the Black-berry bush (or as some cal it the Dog-berry tree) the Leaves of the Sallow tree, and Plantane. Here is likewise useful the Cataplasm that is made of the Rinds of the Pomegranate, and Barley meal boyled in Wine. There may also be administred, Galls, Cypress Nuts, Pomegranate flowers, Bole-armenick, and Terra Sigillata. And when at length there is need of Digestives, there may be Cataplasms compounded of the Meal of Miller, Beans, Flax, and Lupines, boyled in Wine. If the Pustules break, and the *Pus* flow forth, there are likewise Cleansers to be administred. For this end and purpose, this following is fit and proper:

Take *Plantane, Shepherds Pouch, the tops of the Bramble bush, of each one handful; the cups of green Acorns twelve pair; Myrtle leaves one ounce; Pomegranate flowers, Myrrh, and Frankincense, of each half an ounce; boyl them in Water out of the Smiths Forge.* Or,

Take *Rosin, Turpentine washed with Rose water, of each one ounce; Oyl of Roses half an ounce; the Yelks of two Eggs, the juyce of two sweet Oranges: Mingle them, &c.*

In the *Herpes Miliaris* this is likewise very useful:

Take *Chalk, Oyl of Olives, and Vinegar, of each as much as will suffice: Mingle them and make a* Liniment.

Valescus de Taranta, in a proper and peculiar Chapter of the cure of *Formica,* commendeth for a secret this that followeth:

Take *the moist juycy Wool of a Sheep, let it be held to the fire until it be black, and then let it be made into a Pouder: afterward let it be mingled with Rose water that it may become like unto Varnish; with the which let the part affected (with a feather) be anointed thrice every day, until it be wel.* Or,

Take *Barley meal, Bean meal, the meal of Lentils, of each one ounce and half; the pouder of red Roses, Wormwood, the prickly Dock, of each half an ounce: boyl them in the Decoction of Pomegranate rinds, Pomegranate flowers, Plantane: add hereto afterward the Oyl of Myrtle, and Honey, of each a sufficient quantity, and make an Unguent.*

Unto which (if use and need require it) we may also add and mingle the flower of Brass, and such like. And the very same likewise are convenient in the *Herpes Esthiomenos*; as for instance:

Take *Sumach, Plantane, Galls, of each an ounce and half; of branny Bread one ounce; Pouder of Roses half an ounce: boyl them all in Wine, and make a Cataplasm.* Or,

Take *cleansed Barley, Lentiles, Beans, of each one handful; Arnogloss (or Lambs Tongue) two handfuls; Pomegranate flowers, Roses, the grains of Myrtle, Sumach, of each half an ounce. Let all except the* Barley *be grossly poudered, and then boyl them in Wine until the Barley be soft, and make hereof a Cataplasm.* Or,

Take *the Rinds of the Pine tree burnt and washed a dram and half; Ceruss three drams; Frankincense one dram; Goats fat six drams; Oyl of Myrtle two ounces; Wax as much as wil suffice: make herewith an Unguent.*

But if we have a mind to dry more than ordinarily, we may ad the prepared file-dust of Iron, the flower of Brass, and Lime washed.

This is likewise commended:

Take *the spume or froth of Silver half an ounce; the juyce of Leeks and Beets, of each five ounces: Mingle them, &c.*

Hieronymus Fabricius writeth that (with very good success) he made use of this following Remedy:

Take *the juyce of Tobacco three ounces; green or Citron-coloured Wax two ounces; Rosin of the Pine tree an ounce and half; Turpentine one ounce; Oyl of Myrtles as much as wil suffice for the making and forming of a soft Searcloth.*

But if the Ulcer be already putrefied, we must then betake our selves to the Remedies that are stronger and more forcible; such as are the little sweet Bals of *Andro, Musa,* and *Polyidas*: as for example;

Take *Litharge, and Ceruss, of each two ounces; the Rinds of Pomegranates half an ounce; Myrrh one dram; Frankincense a dram and half; the flower of Brass and Allum, of each a dram; and with the Oyl of Myrtle and Wax (a sufficient quantity of each) make an Unguent.*

But if these wil not serve the turn, and that the Ulcer and putrefaction creep further, and become broader, we must then have recourse unto the stronger sort of Remedies.

They refer likewise unto cholerick Tumors those that we cal *Phlyctænæ, Impetigines, Lichenes, Sudamina,* and *Epinyctides.* But because that these little risings or swellings proceed not from pure Choler, but from Choler mingled with serous and salt Humors; we wil therefore

treat

treat of them below, with the reſt of the Tumors of this kind.

Chap. 18. *Of the Tumor* Oedema.

LIke as thoſe Tumors that we have already hitherto handled, have their original from hot Humors; ſo there are likewiſe ſome certain peculiar Tumors that ariſe from cold Humors; and in the firſt place, *Oedema*, that hath its original from Flegm. For although *Hippocrates*, and other ancient Phyſitians under the name of *Oedema* underſtand al other Tumors whatſoever in general; yet notwithſtanding thoſe of latter times by *Oedema* do underſtand ſome one certain kind of Tumor only, and this they ſpecially term *Oedema*; being a Tumor that is lax or looſe, ſoft, without pain, yielding unto the touch and compreſſion of the fingers, having its original from thin flegm, or elſe from the more cold and moiſt part of the Maſs of blood.

The Cauſes.

The containing Cauſe of this Tumor is that flegm that is contained in the blood, to wit, if it be ſo increaſed, that it irritate and ſtir up the Expulſive Faculty. For then Nature being ſtirred up and provoked thruſteth forth the matter out of the greater Veſſels unto the leſs, and expelleth it from the more noble parts unto the weaker, until at length it be received and retained by the moſt weak and infirm part. The cold and heavy Humor it ſelf likewiſe very often by its own weight tendeth downwards, and alſo unto the extream parts. And thereupon it is, that although the *Oedema* may be excited in al parts whatſoever of the body; yet notwithſtanding it chiefly and more eſpecially ariſeth in the Hands, and the feet, (as is evidently appeareth in Perſons that are Hydropical, Cachectical, and Phthiſical) in regard that thoſe parts are more remote from the fountain of heat. But now this *Oedema* is not ſuddenly generated, but by degrees, and by little and little. For why? the Humor is thick, and therefore altogether unfit for any ſpeedy and ſudden motion.

Galen, in his ſecond Book to *Glauco*, and third Chapter, determineth that the *Oedema* is cauſed by a Pituitous or flegmy ſubſtance, or elſe by the Spirits when they are ful of vapors; and ſuch a like Tumor or ſwelling happeneth in dead Carkaſſes. From which place (as likewiſe from the 14. of his Method of Phyſick, Chap. 4.) *Johannes Philippus Ingraſſias*, in his Book of Tumors, the firſt Tome, page 113. endeavoreth to prove a twofold kind of *Oedema*; the one from thin flegm; the other from a vaporous ſpirit: and that (to wit, the former) he aſſerteth to be a Diſeaſe; and the latter a Symptom only that followeth upon Phthiſis, and the water betwixt the Skin, (one ſpecies of the Dropſie) and the Cachexy. But yet although it be not to be denied that Carkaſſes (in the very firſt beginning of their putrefying, and as it were a certain kind of fermentation) ſwel up in ſome ſort; yet that in the Cachexy, or Phthiſis, the *Oedematoſe* ſwellings of the Feet ſhould in this ſame manner be cauſed, I cannot eaſily beleeve; in regard that ſuch a like putridneſs doth not then happen; but it is far more credible, that ſuch like Tumors are cauſed from a ſerous wheyiſh Humor abounding in the body, and deſcending unto the Feet, and there abiding and ſticking faſt, as in a part more cold than the other parts of the Body. And be it indeed granted and admitted, that in the ſimilar parts there may be ſome kind of flatulent Spirit collected, and that it may lift up the part into a Tumor; yet notwithſtanding this Tumor is not properly *Oedema*, but is rather to be termed *Empneumatoſis*, or *Emphyſema*. And albeit ſuch a like Tumor is by *Galen*, in his 14. Book of the Method of Phyſick, Chap. 4. called a Symptom; yet we ſay, that *Galen* then uſeth the name of a Symptom (in the general) for every Affect preternatural that followeth another.

But if we wel weigh and conſider what this Tumor properly is, we affirm that it is altogether and in al reſpects a Diſeaſe; in regard that it is magnitude augmented, and for the moſt part an impediment and hindrance unto men in their walking. And although ſuch an *Oedema* doth not indeed require a peculiar Cure; yet notwithſtanding it is not for al that to be razed out of the number of Diſeaſes, and placed among the Symptoms. For thoſe Diſeaſes that ſimply depend upon other Diſeaſes require not any proper and peculiar kind of Cure; but thoſe being removed, theſe likewiſe are taken away.

But now that very Humor that is the cauſe of *Oedema* is generated by an error and default in the ſanguification; touching which we have ſpoken in the third Book of our Practice, third Part, ſecond Section, and firſt Chapter.

The Signs Diagnoſtick.

Oedema is known in this manner: The Tumor is ſoft, and looſe; and if it be preſſed down with the finger, it eaſily yieldeth and giveth way by ſinking, and ſo there is a little pit and print of the finger left behind. For the moiſt flegm ſofteneth and looſeneth the part, and is more thick than ordinary, and therefore the more unfit for motion. It is either altogether without pain; or certainly if there be any it is very little, and ſcarcely ſenſible. For the flegm looſeneth the part; neither doth it by diſſolving unity excite any pain. The colour is ſomwhat white; there is an abſence of al heat; neither is there in this (as in other Tumors) perceived any kind of pulſation or beating. By which ſaid ſigns it is eaſie to diſcern an *Oedema* from other Tumors.

Prognoſtick.

Prognosticks.

1. *Oedema* in it self is a disease of no danger; for neither is the disease it self great, neither is the cause thereof of a dangerous consequence, nor is there any il Symptom therewithal conjoyned. And if there be (as indeed there often is) any danger unto such as are affected with this *Oedema* (as it hapneth in the Phthisis, Cachexy, and the Dropsie) this chanceth not by reason of the *Oedema*, but from those Diseases that the *Oedema* followeth. Whereupon we ought to distinguish whether the *Oedema* arise of it self, or else whether it follow upon other Diseases: since that the *Oedema* that followeth after the more noted and considerable faults of the parts designed for Nutrition, wanteth not for danger. For although it be true, that oftentimes (without any danger) the Feet swel after Diseases of long continuance (from crudities collected by the disease) yet notwithstanding if such like *Oedema's* shall happen from a Refrigeration, or by reason of any other fault in the Liver, they are then dangerous; and threaten death by reason of those causes upon which they depend. But if there be no such thing joyned together with the *Oedema*, then there is no danger at al to be feared.

2. But yet, although *Oedema* be a disease without any danger; yet notwithstanding, it is of a long continuance; for the matter is colder, and therefore it cannot be overcome but in a longer time.

3. But yet it is terminated by a Resolution; unless (which sometimes happeneth) the matter be hardened.

The Cure.

As touching the Cure, we must first of al consider (as was said before) whether the *Oedema* follow any other Disease of the more noble parts. For if this shal happen, our care ought especially to be, that the Disease upon which it depends be taken away; since that unless this be taken away it cannot be cured, and that if this primary Disease be removed it then vanisheth of its own accord. If yet notwithstanding the *Oedema* bring along with it any trouble, and that it prove hard to be cured, it wil not be amiss then to rub the part wel with Oyl mingled with Salt, or to foment it with a Spunge soaked in Wine, in which Wormwood hath been boyled. But if the *Oedema* arise without any other Disease, then in the first place, the cause from which the matter is supplied is to be removed and taken away. And therefore in the very first beginning, the course of Diet that is to be ordained must be such that in the least tendeth not to the generating and breeding of flegm, but rather such as wasteth and destroyeth it. And therefore let the Air in which the sick person abideth be dry; and likewise, let the meat and drink that he lives upon have a power and quality of attenuating and drying. Let the sick party therefore be very sparing and temperate in meat and drink, that so the Natural heat be not oppressed and overwhelmed, and so by the weakening of it Crudities be generated; but that the said heat may rather wast and consume those crudities, and the more fitly and effectually work upon them. Let his Bread be wel baked, and leavened: and let him altogether abstain from bread unleavened; and let him but seldom eat either Pot-herbs or Broths. Fish is altogether unfit for him, unless it be fresh River fish, and of them such as are of a more solid substance, and these likewise (even as al other his food) are to be seasoned and sauced with Spices and drying herbs. Al endeavor must be used that the Belly may dayly discharge its office; which if of it self it cannot do, it wil then be requisite that before his meals he take some Aloes, which looseneth the Belly, and consumeth and drieth up the superabundant humidity. Before meals (if it may be done without any offence and prejudice unto the part affected) let the sick person exercise himself, that so the superfluous moisture may be consumed, and the Native heat excited and stirred up: and to conclude, let him sleep only in the night, and let his sleep then likewise be but short.

Secondly, In an *Oedema* properly so called Venesection hath no place at al; for here the blood is no wayes peccant, but only the flegm: but the cold and crude humors in the body are to be concocted and evacuated. And first of al, the matter is to be digested and concocted by Medicaments that heat and dry, such as are elsewhere often propounded in the preparation of the flegmy humor; of which a certain Hydromel or Oxymel may most fitly be compounded. But yet notwithstanding if the humor be only wheyish, there is then no need at al of concoction.

Afterward the matter is to be evacuated by Medicaments that draw forth the flegm, which are elsewhere propounded. As for what concerns the part it self that is affected, the pituitous or flegmy humor which hath flown together into it ought to be evacuated; and this may be done by Repellers and Digestives, or those things that discuss and scatter. But if Repellers be made use of, they are to be administred, not so much to drive back the humor, as to confirm, and strengthen the part, and to dry up and consume the matter; unto which likewise there may not unfitly be added some of those Remedies that have in them a power and virtue to discuss. To this end and purpose, *Galen* maketh use of a new Spunge (or if a new one may not be had, than any other) throughly wet and soaked in Nitre and Ley, and Posca, that is, a mixture of Vinegar and Water. There may likewise be used the courser part of Hemp (which we cal Hurds) instead of the Spunge. Which said Medicament if it accomplish not our desire, the quantity of the Vinegar may then be augmented,

and

and a little Alum therewith mingled. And if neither this effect our purpose, nor satisfie our expectation, we ought then to betake our selves unto those that are stronger and more forcible. As,

Take Flowers of red Roses, Camomile, the Leaves of Myrtle, and of Wormwood, of each half an handful, Pomegranate Flowers, and the Cypress Nut, of each one handful; Alum, and common Salt, of each one ounce and half; boyl them in Vinegar and Water, or in Ley, and so apply it with a Spunge, a Linen Cloth, or Hurds. Or else,

Take the Leaves of the Sallow Tree, Myrtle, Wormwood, the Flowers of Camomile, and of St. Johns-wort, of each half a handful: let them be all boyled in Ley until all the Ley be consumed; afterward, let them be wel pounded and bruised, and then add the Oyl of Myrtle, of Roses, and of Wormwood, of each one ounce; Salt half a handful, Nitre one ounce; make a Cataplasm. Or,

Take Cypress Nuts, Pomegranate Flowers, of each half a handfull; Flowers of Camomile and red Roses, and the Leaves of Wormwood, of each half a handful, the meal of Barley and Lupines, of each half an ounce, Alum three drams; Aloes and Myrtle, of each one dram; Saffron one scruple; boyl them in a sufficient quantity of Water and Vinegar; and make a Cataplasm.

Afterward in the state we are to proceed unto those things that discuss and dry much. For this purpose there is commended the Water of Lime, or a Ley of the Vine ashes applied with a Spunge; Or,

Take Marshmallow Roots, one handful, the Flowers of Camomile and Melilote, of each half a handfull; boyl them in Wine and Vinegar, adding afterwards of Hoggs Fat two ounces, old Oyl half an ounce, the Spume or Froth of Silver one ounce; Mingle them, and make a Cataplasm.

That Medicament is also very efficacious that is made of Rue, Honey, and Salt. Or,

Take Sulphur one ounce, Pigeons Dung ten drams, Bean meal one ounce and half, the meal of Lupines one ounce, Honey one ounce and half; and so make a Cataplasm with the Decoction of Camomile flowers. Or,

Take Sulphur, Myrrh, Salt, of each one ounce, old Oyl and Vinegar, of each as much as will suffice, and make a Liniment. Or,

Take Bryony roots two ounces, Wormwood, Bearfoots, Camomile, Melilote, of each half a handful; boyl them in Water or Honey, and being wel bruised & searced, add to them the powder of red Roses, the Meal of Beans and Lupines, of each half an ounce; old Oyl as much as will suffice, and make a Cataplasm. Or,

Take the Root of Asphodil, and the wild Cucumber, white Lilly roots, and Flowers of Camomile, of each one handful; boyl them untill they be soft, and then add of Leaven, Tartar, washed or slaked Lime, and Sulphur, of each an ounce, Frankincense six drams, the Fat of a Hart, the Marrow of the Thigh-bones of Oxen, of each ten drams; make a Cataplasm.

There is likewise commended Ox dung, or Cow dung; for it both mollifieth and resolveth; of which with Sulphur, Frankincense, Honey, Vinegar, and the Broth of a Cabbage or Colwort, there may be made a Cataplasm.

In the applying of all which Medicaments, it is requisite that we observe, that before ever the Emplasters, or Unguents, and Liniments, be applied, the part be first made hot by frictions or rubbings and fomentations; for otherwise the Medicaments will not easily effect and accomplish our desire and expectation, by reason of the coldness of the part. The frictions may be made with hot Linen Cloaths; the fomentations may be of the Decoction of Camomile flowers, and Melilote flowers, and of the Leaves of Betony, Sage, Rosemary, Lavender, Organy, Wormwood and the like. For by the said fomentations and frictions the heat together with the blood is called back unto the part; and the excrements and superfluous humors are somwhat dispersed and scattered.

But if it be so that the *Oedema* seem to wax hard, and to pass into a *Scirrhus*, then we are likewise together with the former, to make use of Emollients or mollifying Medicaments. And for this use and purpose there is to be applied Vinegar, in which the *Lapis Pyrites* (we commonly call it the Fire-stone) or a piece of Mill-stone taken red hot out of the Fire hath been quenched; and after this the part is to be anoynted with old Oyl in the which the Root of the Wild Cucumber, and Marshmallow Roots have been boyled. Or,

Take the Mucilage of Marshmallow roots, Linseed, Fenugreek, Goose fat, the Marrow of a Leg of Veal, the Flower-de-luce root, Camomile flowers, of each two ounces; Styrax liquid, Mirrh, Frankincense, and oyl of Camomile, of each one ounce; Wax as much as wil serve the turn; and so make an Emplaster.

But touching these Remedies we shall speak further, when we come to treat of a *Scirrhus*.

And although indeed it be true, that the *Oedema* is most frequently discussed and dispersed by Resolution; yet sometimes notwithstanding (as is apparent out of *Hippocrates* in his Book of Prognosticks Text 27.) it cometh to a suppuration, but this is but seldom, to wit, if it be in a place somwhat hotter than ordinary, or else that any other humor be therewith mingled, as it happeneth in the *Oedema Phlegmonodes*; and this if it happen there is then perceived in the next adjoyning part both a pain, and a pulsation or beating. And therefore at such a time the Suppuration is to be furthered

furthered and haſtened on by thoſe Medicaments that we call Emplaſtick; ſuch as are *Diachilon ſimplex*, and other Remedies made of the Roots of Marſhmallows, the common Mallows, Linſeed, Fenugreek, with the Fat of a Hen, or ſuch like. As for example,

Take *Bearfoot, Marſhmallows, the Roots of white Lillies, of each one handful; boyl them, and when they are ſufficiently bruiſed, add to them the meal of Linſeed, and Fenugreek, of each two ounces; Hogs Greaſe, and Hens fat, of each three ounces; Saffron half a dram, and thereof make a Cataplaſm.*

The matter being concocted and ſuppurated, we are not to expect a ſpontaneous or ſelf-effecting Cure, in regard it wil be a long time ere it come to this. Wherefore let the place be opened either with the Inſtrument for that purpoſe, or elſe with a potential Caurery; and afterward let the Impoſtume be throughly cleanſed and purged with Turpentine, Frankincenſe, Honey, the Juyce of Wormwood, and Honey of Roſes: furthermore, let the Cavity or hollowneſs be filled up with the Unguent *Baſilicon*, the Unguent *Aureum*, & the Unguent of Betony, and ſuch like; and at length let there be a Cicatrice drawn over it.

Chap. 19. *Of a* Scirrhus.

HAving treated of thoſe Tumors that ariſe from the Blood, Choler, and Flegm; and it now remaining that we handle thoſe Tumors that ariſe from Melancholly and black Choler; and it being ſo that a *Scirrhus* (to ſpeak the truth) ariſeth from both Melancholly and Flegm, the next thing therefore that we have to do, is to treat of the *Scirrhus*. Now then a *Scirrhus* is a hard Tumor without any ſenſe or pain (or if there be any it is certainly but very little) ariſing from a thick humor that is Viſcid, Clammy, and Cold; ſuch as is the melancholly humor and flegm fixed and faſtened in the parts. For there are two humors, (to wit, Melancholly and Flegm) out of which either ſingly and ſeverally, or elſe mingled together, the *Scirrhus* ariſeth, as they commonly determine. Now here (in this place) by Melancholly we are to underſtand, not that black humor which ariſeth either from the Natural and aduſt Melancholly humor, or elſe from yellow Choler aduſt; but here we are to underſtand that Melancholly that is Natural, and properly called the Melancholly humor, to wit, the thick and more feculent or dreggy part of the Blood, or elſe likewiſe the Natural Melancholly Excrement, or elſe alſo (thirdly) a thick humor ariſing from an hardned Inflammation; the which if any one ſhal pleaſe to term Preternatural, I wil not in that gainſay him. But by Flegm we are not to underſtand that Natural Flegm, or the Flegmatick humor (which is moiſt and thin, and from which the *Oedema* proceedeth) but a thick Flegm, extraordinary dry, Glutinous, Viſcid, and Clammy. Of both theſe humors retained in the part over long (whenas the more ſubtile and thin parts thereof are vaniſhed and gone, and the more thick and groſs parts left behind) is the *Scirrhus* generated. For although ſome humor that is thick may flow unto ſome certain part; yet notwithſtanding a humor ſo thick and glutinous that it inſtantly cauſeth and produceth a *Scirrhus*, doth not eaſily flow unto any part whatſoever, but it by degrees and after ſome time becometh ſuch in the very place affected, whenas the thinner part of the humor being waſted and conſumed, the thicker and groſſer are left to remain behind. From whence it is, that (for the greateſt part) the *Scirrhus* followeth upon other Tumors (as for inſtance, Inflammations, *Eryſipela's* and *Oedema's*) when they are not ſufficiently and rightly cured, and that the thinner parts by means of heating Medicaments are either unſeaſonable, or overmuch and exceſſively diſſipated; or elſe are by Repellers and Aſtringents repreſſed, ſo that the more thick and groſs parts only are left behind; which being further incraſſated and thickned, do cauſe and produce this Tumor, that (as we ſaid before) is hard, and without pain and ſenſe. From all which Premiſes it may eaſily be collected, that this Tumor is not ſuddenly all at once generated, but by little and little.

Yet notwithſtanding *Paræus* diſſenteth from this common and received Opinion; and aſſerteth that the *Scirrhus* is cauſed, not from the excrementitious humors, but from an alimentary juyce (yet ſuch as is more thick than is fit and convenient for the nouriſhing of the fleſh) when it becometh hardened; unto which notwithſtanding there is (ſaith he) another humor adjoyned: and this hardening proceedeth (as from divers other cauſes, ſo likewiſe) from an Inflammation; not that the blood that is not diſcuſſed or ſuppurated is thus hardened, or condenſed by the over frequent and unſeaſonable application of cold things; but that the blood being diſcuſſed by the vehement heat of an Inflammation, the juyce and moiſture of that part that was inflamed is thickned and hardned.

But now a *Scirrhus* is twofold, *viz.* Legitimate (as we may ſo term it) and Illegitimate. Which ſaid diſtinction (as *Fallopius* truly tels us) is not taken from the diverſity of the matter, and the conteining Cauſe, but from the divers and different accidents and proprieties of the matter. For before ſuch time as all the more ſubtile and thin parts are either diſſipated or conſumed, there is as yet no abſolute *Scirrhus*, neither do all things then want ſenſe, neither is there as yet any perfect hardneſs appearing. But it (al the thinner parts being waſted and conſumed) only the thicker ſhal remain behind, and theſe ſhal harden even almoſt unto the hardneſs of a Stone;

and that the part is void not only of al pain, but likewise even of al sense; then the *Scirrhus* is now already absolute and perfect. But perhaps there can nothing be said to the contrary, why we may not term the *Scirrhus* that is not as yet absolute impure likewise, and bastard, or spurious. Or if this distaste, and please not; the *Scirrhus* (we say) may furthermore be divided into that which is pure, and truly so called, and that that is impure and spurious or counterfeit: and that may be called pure which hath its Original from melancholy alone, or from thick flegm; and that impure and spurious which hath another humor mingled together with it, from whence it is called *Scirrhus Phlegmonodes*, or *Scirrhus Cancrosus*. There be some certain Authors that give us also another difference of a *Scirrhus*, from the parts wherein it resideth. For although in very many parts it hath no peculiar appellation, but is only defined by adjoyning to it the name of the part affected (as we say the *Scirrhus* of the Liver, and the *Scirrhus* of the Spleen) yet notwithstanding in some certain parts it hath a proper appellation: for in the Nerves it is called *Ganglion*, in the Glandules (or kernels) *Struma*, in the Joynts *Porus*; of which in their proper places.

Signs Diagnostick.

The *Scirrhus* is known from two signs especially, to wit, the hardness, and the absence or want of pain: unto which this may likewise be added, That when it is pressed it wanteth sense; and then we say, that the *Scirrhus* is altogether absolute and confirmed. And it is not to be wondred at, that the part thus affected should have no sense, or that there should be so little, if any sense at al, in a *Scirrhus*; for both the influx of the natural spirits is hindered by the matter that is impacted and fast fixed; and also the very temper it self of the Member is so changed that the part becometh altogether stupid. Others there are that add other signs also; viz. a Color somwhat black and wan; which yet notwithstanding is only a sign of that *Scirrhus* that ariseth from the Melancholy Humor; and if the temper be very cold, by reason of a thick and cold Humor, it is then likewise perceived by the touch.

The Differences.

The Differences are taken from the Sense, either dull, or none at al. For if there be no sense at al present, the *Scirrhus* is now Legitimate and absolute: but if there be yet any manner of sense left remaining, it is not Legitimate and absolute. There are some likewise that add this, that in a Legitimate *Scirrhus* there grow hairs upon the part. The color wil inform us whether it hath its original from flegm, or from Melancholy; this color in flegm is somthing white; but in Melancholy, blackish, and wan.

Prognosticks.

1. As for what concerneth the Event, that *Scirrhus* that is altogether destitute of al sense, is incurable.

2. But that *Scirrhus* that is not destitute of al sense, although it be not altogether incurable, (especially if at the beginning fit and proper Remedies be applied) yet notwithstanding it is not very easily cured; especially if it stick in any one of the more noble parts, as the Liver, or the Spleen likewise; since that the Liver and the Spleen wil hardly bear or admit of those so strong Medicaments which are requisite in a *Scirrhus* that is perfectly hardened; and those that are weak avail but little or nothing.

3. If there be any hopes of a Cure in a *Scirrhus*, yet this is not to be brought unto perfection, but in a long time. For to mollifie and soften the matter that is thick, cold, and hard, is a thing that is not easily done; neither indeed can it be done at al, but by little and little, and in a longer time than ordinary.

4. But when they may be cured, it is to be done in a twofold manner: either by Resolution and Discussion; or else by Maturation and Suppuration. But it is seldom that they are suppurated, and then likewise not without danger: for when they are suppurated they easily degenerate and pass into Cancers; especially those of them that proceed from a Melancholy Humor.

The Cure.

As for what therefore concerneth the Cure, although there be a plain and absolute Tumor or Swelling already appearing, and that in the Cure we ought especially to have respect unto the containing Cause; and that we are to do our endeavor that it may be removed by Topical Remedies; notwithstanding the Antecedent cause is also not altogether to be neglected; and here we must prevent the augmentation of the Malady by the supply of any new matter.

Wherefore (first of al) whatsoever it be that generateth thick blood is carefully to be avoided; and such meats are to be chosen that are easily concocted, and such as make a supply of good Nutriment; and such as incline and tend to humidity and moistness.

Secondly, the Humors (whether flegmatick or melancholick) are (being first wel prepared) to be evacuated by convenient and fit Medicaments; touching which we have already elsewhere spoken.

But thirdly, and principally, we ought to use our utmost endeavor, that the Containing Cause and the matter that maketh the *Scirrhus* be quite and clean taken away. But as for Repellers, here is no place for them. For since that the matter is both thick and cold, it wil not yield nor give place unto Repellers; but rather by the use of them

them is the more incraſſated and thickened, and as it were impacted, and made to ſtick the faſter in the part. Neither likewiſe are thoſe Medicaments that greatly heat and dry fit and proper in this place; for by theſe the matter is only the more hardened. But thoſe Medicaments that are here moſt conveniently adminiſtred, are, thoſe that have a vertue and quality to mollifie that that is hardened, and ſuch as afterward diſcuſs and ſcatter the matter when it is ſoftened. Malactick or mollifying Medicaments are therefore to be adminiſtred and applied, that are of a hot temperament, and yet notwithſtanding but meanly, and not greatly drying; but neither yet manifeſtly moiſtening; but ſuch as obtain as it were a certain middle nature between Moiſteners and Dryers, and ſuch as accompliſh (as it were) a reſolution and ſoftening of the hardened ſubſtance. And ſuch are, *The Oyl of ſweet Almonds, the Oyl of Camomil, and white Lillies, Hens fat, Gooſe fat, Swines fat, the Marrow of Veal, and of a Hart, the Mucilage of Marſh-mallow Roots, Linſeed, and Fenugreek; and ſuch are likewiſe the Leaves and Roots themſelves, of Marſh-mallows, Mallows, Linſeed, Fenugreek, the Root of white Lillies, Bears-foot, dried Figs that are ful and fat, Wax, &c.* And ſtronger than theſe, are, *Bears fat, old Oyl, Bdellium, Styrax liquid, liquid Pitch, fat Roſins, Ammoniacum, Galbanum.* But we muſt carefully obſerve, when thoſe Medicaments that are more mild and moderate are to be made uſe of, and when the ſtronger ſort.

In a *Scirrhus* that is but newly begun we are to uſe thoſe Medicaments that are of the milder ſort: but in an old and inveterate *Scirrhus* that is become hard, thoſe Remedies that are more ſtrong and prevalent are to be put in practice. Moreover, the very Body it ſelf, and likewiſe the part affected, are to be conſidered. For unto an hard body the ſtronger ſort of Medicaments are to be applied; but for the tender and more ſoft bodies the milder and gentler ſort of Remedies are moſt convenient. The part if it be harder and thicker (as if the *Scirrhus* be in a Tendon or Ligament) then we ought to adminiſter and make uſe of the ſtronger Medicaments. And in the general we are to obſerve this for a Rule, That we handle the *Scirrhus* with al manner of care and caution. For if we adminiſter thoſe Remedies that do overmuch and more than is fitting Reſolve, then (as we alſo already ſaid before) the *Scirrhus* paſſeth into a ſtony hardneſs. But if we too much mollifie, there is then a fear that the *Scirrhus* may degenerate into a Cancer. Wherefore it is moſt ſafe in this caſe to follow the counſel and advice of the Ancients, that we uſe not alone any Medicament that hath in it a power either only to dry, or only to moiſten; but that we adminiſter ſuch Remedies as mollifie and diſcuſs; not together, but by turns, and one after the other; or otherwiſe that we mingle together Emollients or Mollifiers with Digeſtives. And for this uſe *Galen* commendeth the fomentation of Vinegar, wherein the fire-hot *Pyrites* ſtone hath been extinguiſhed in this manner; Let the part be fomented with the Decoction of Marſh-mallows, Mallows, Bears-foot, the ſeed of Fenugreek, Linſeed, and the like Emollients. Afterward, take the *Pyrites* or Fire-ſtone, or a piece of a Mill-ſtone, and having made it red hot caſt it into the Vinegar; or elſe let the Vinegar be caſt and poured upon that hot and glowing ſtone, and then let the vapor of the Vinegar ſteam up and be received into the Member affected. After this, let the Emollients be again adminiſtred; and let theſe Remedies be (as they ought) often repeated at many ſeveral times, and ſucceſſively. And in this manner the *Scirrhus* that is almoſt deſperate may be cured. But if it be over tedious to uſe theſe Medicaments (in the aforeſaid manner) at ſeveral times, and by turns, then let them be al mingled together. For by this means, at one and the ſame time, and together, the Tumor is mollified, and that that is mollified is diſcuſſed and diſſipated by exhaling and breathing forth. For which end and purpoſe, out of the Simples before-mentioned there may be divers Medicaments compounded. As,

Take *Unſalted Butter, Scammony, Wax, of each as much as ſhal be thought ſufficient; and then mingle them.* Or,

Take *the Meal of Fenugreek, Linſeed, Marſh-mallow Roots, the Pouder of the Holly-hock Root, of each one ounce; boyl them, and afterwards add, of freſh Butter an ounce and half; Styrax liquid, Bdellium, Ammoniacum diſſolved in Vinegar, of each half an ounce; Mingle them.* Or,

Take *Marſh-mallow Roots, the Roots of white Lillies, boyled and wel bruiſed, of each three ounces; fat and ful dried Figs boyled, in number ſix; Ammoniacum and Bdellium diſſolved in Vinegar, of each one ounce; Styrax liquid half an ounce; Gooſe fat, Hens fat, the Marrow of a Leg of Veal, of each three ounces; Oyl of white Lillies, Oyl of Camomil, and Wax, of each a ſufficient quantity; Make an Emplaſter.* Or,

Take *the Meal of Beans, Fenugreek ſeed, Lin-ſeed, of each ſix drams, the Root of Marſh-mallows one ounce; Pitch five drams; Gooſe fat, as much as wil ſuffice; Make an Emplaſter.* Or,

Take *the Mucilage of Marſh mallow Roots, and Fenugreek, of each one ounce; Fat dry Figs three ounces; Oyl of white Lillies, Camomil, Lin-ſeed, of each two ounces; Hens fat, Gooſe fat, Swines fat or Hogs Greaſe, Goats ſuet, Turpentine, Litharge of Gold, of each four ounces. Boyl them al, until the moiſture be conſumed, and then with a ſufficient quantity of*

Wax, and adding thereunto Ammoniacum, and Galbanum dissolved in Vinegar, of each three drams; and Flowerdeluce Root wel bruised two drams; make an Emplaster. Or,

Take *Ammoniacum, Bdellium, Galbanum, Opopanax, Styrax liquid dissolved in Vinegar, of each one ounce; Litharge of Gold ten drams; let them boyl in Vinegar: afterwards add, Pellitory, live Sulphur, of each half an ounce; Oyl of white Lillies and Wax, of each a sufficient quantity. Make an Emplaster.*

But now in the administring of these Medicaments we ought alwaies seriously to observe whether the *Scirrhus* arise from flegm, or else (in truth) from a Melancholick humor. For if it hath its original from this last, it is then more warily and cautelously to be handled, than if it proceeded from flegm, left that it turn into a Cancer; and especially, if it incline toward a suppuration, we must have a care that it be not too much irritated by hot Medicaments.

Chap. 20. *Of a Cancer.*

THe Cancer (by the Greeks called *Carcinos*, and *Carcinoma*, so termed because it resembleth the Water-Crab or Crevish) is generated from an adust Humor, or black Choler. And yet notwithstanding *Celsus* seemeth to put a difference between *Carcinoma* and *Cancer*. For in his fift Book, and 28. Chapter, he calleth the disease that we treat of in this Chapter only *Carcinoma*. But in the same Book, and 16. Chapt. he giveth the name and appellation of a Cancer (in general) unto certain creeping Ulcers; under which he likewise comprehendeth the *Erysipelas* that is exulcerated, the *Gangrene* also, and the *Sphacelus*. But yet notwithstanding al other Physitians whatsoever use the words *Carcinoma's* and *Cancers* as *Synonyma's*, that is, as words signifying one and the same Disease. For a *Cancer* is a Preternatural Tumor arising from black Choler, round, of a wan color, or somwhat blackish, painful; and which (when the Veins every where round about are filled and strut out) resembleth the feet of the Crab, Crevish, or Crawfish.

The Causes.

The Cause of a Cancer is black Choler, in which either yellow Choler, or the Melancholy Humor hath degenerated, by reason of its being burnt. For the Melancholy Humor, while it yet continueth to be Natural, and is not yet burnt, doth never cause or produce a Cancer, but another Species or kind of *Scirrhus*. But from the black Choler alone, if it be burnt, (which sticketh fast in the Veins, neither can it by reason of its thickness penetrate into those streight and narrow passages, as the Melancholy humor doth that causeth the *Scirrhus*) the Cancer is excited and generated. But now of this black Choler there is a certain difference; for some of it is more mild and moderate, or less hot and sharp; but then another sort of it is very sharp and hot. That which is more mild causeth a secret hidden *Cancer* that is not exulcerated; but that that is more hot and sharp exciteth an exulcerated Cancer. Now the said black Choler is more or less sharp, according as it is more or less burnt, or arise from a humor that is more or less sharp. Whereupon it is, That that which proceedeth from yellow Choler adust and burnt is worse than that which hath its original from a Melancholy humor. And look by how much the longer it abideth in the place affected, and by how much the more it is putrefied and burnt, by so much the more it is rendered the worse. And hence it is that the Natural Melancholy humor also which first exciteth a *Scirrhus* if it stick and abide long in the part, and especially then when it is not handled with al care and caution in the applying of heating and moistening Medicaments, it afterward exciteth and causeth a Cancer. But whether the Cancer be without any Ulcer or no; and whether the black Choler be mild and moderate, or else exulcerated, and the cause more sharp; yet however notwithstanding, in, and of it self it is alwaies without a Feaver; although accidentally a Feaver may happen thereupon. In the mean time (we say) the Cancer it self is a hot Tumor. For although some there be that doubt whether a Cancer be to be ranked and reckoned up among the hot or the cold Tumors; (as there be likewise that question whether black Choler be a hot or a cold humor;) and although by the Arabian Physitians a Cancer is accounted and reckoned up among the cold Tumors, and *Galen* seem to incline thereunto, in his Book of black Choler, Chap. 4. and in his 2. to *Glauco*, Chap. 10. yet notwithstanding it is by the same *Galen* in his Book of Tumors, Chap. 8, 10, 11. most rightly and truly reckoned up among the hot Tumors; since that it hath its original, not from the Melancholy humor cold and dry, but from black Choler, hot and dry. For albeit the Melancholy Humor may possibly give the first occasion of this Tumor; yet however notwithstanding the Cancer is not generated from it, unless the said Melancholy Humor degenerate and turn into black Choler; whether this happen in the Vessels, or in the part affected; like as somtimes a *Scirrhus* (as ere while we told you) that is produced from a Melancholy Humor may pass and turn into a Cancer. And this is the conjunct cause of a Cancer; to wit, black Choler, a humor hot and dry, sharp, Salt, corroding and corrupting al things; generated and bred from the heat of other humors, the heat now ceasing, or at least being not so vigorous that it may excite and cause a Feaver; as it is wont to be in a *Phlegmone* and *Erysipelas*.

It is likewise generated from other Causes. For now

now and then a hot distemper burneth up and inflameth the Humor, and so generateth black choler: and sometimes the Food (Meat and Drink) being such as hath in it a disposition and tendency unto the generating of such a like humor, by the frequent use thereof, and in process of time, becometh the Cause of black Cholet: and sometimes the very Spleen it self being grown weak, and not able to attract and draw unto it self that that is generated of the Melancholly humor, doth thereupon leave this humor in the Body, which after it hath been for a while detained in the Body is inflamed and burnt up. The very same likewise happeneth, if either the monthly Courses (in Women) be suppressed, or the Hemorrhoids obstructed.

And in truth, the Cancer is generated and bred in all the parts, both external and internal; and yet notwithstanding it especially appeareth (as *Celsus* tels us in his fifth Book, Chap. 28.) in the superior parts, about the Face, Nosethrils, and Ears, Lips, the Paps or Breasts of Women; which chiefly (by reason of their laxity and loosness) do very easily receive that humor; and then again (in regard of the consent and agreement it hath with the Womb) they readily admit of those vitious and naughty humors that ought to have been purged forth through the Womb.

The Signs Diagnostick.

At the first beginning the *Cancer* is not so easily known; because that at first it is scarcely so big as a Vetch or a Bean: but then afterwards, when it is grown, and hath gotten so much augmentation and enlargement that it is now lift up into a greater bulk, it hath with it then signs and symptoms so evident and so grievous, that it by any one may be most easily known. For this Tumor is hard, it hath a leaden, or wan, or blackish color; and yet notwithstanding this is more or less such, according to the diversity of the matter. There is present likewise a pain to attend it; the which (although it may indeed be sometimes greater, and sometimes less) yet notwithstanding the *Cancer* is never wholly without it. There is likewise present an heat, pulsation or beating; and round about (as it were in a Circle) it hath Veins distended, and strutting out with black Blood. Now although the *Scirrhus* arising from a melancholly humor hath some kind of likeness and affinity with a *Cancer*; yet notwithstanding by the aforesaid and other signs it may easily be discerned from it. For a *Cancer* hath evermore a pain and pulsation conjoyned therewith, together with an heat more than ordinary; and most commonly it beginneth of it self, and suddenly getteth encrease, so that from a very smal and inconsiderable bigness it becometh exceeding great and bulky; and there is for the most part a humor residing in the Veins, which said Veins being therewith filled very full resemble the Feet and Claws of Crevish or Craw-fish. But now in the *Scirrhus* there is no pain appearing; and for the most part it hath its original from the Change and alteration of other Tumors; and the humor that produceth the *Scirrhus* doth not chiefly and principally reside in the Veins, but in the spaces and Pores of the Parts; from whence also it is, that the Veins are not ample, wide, and large, neither turgid, and strutting out; and the increasing and growth thereof is much more slow than that of a *Cancer*. But now if the Cancer be already Ulcerated, then the Ulcer is nasty and stinking, the lips are swoln, thick, and pale or wan.

The Prognosticks.

1. In the general, every *Cancer* is a most grievous and a dangerous Disease; and such as is seldom or never cured. For the Cause thereof being over thick is obstinate and malignant; and oftentimes it seizeth and surprizeth even those Veins also that lie low and deep; insomuch that it cannot be removed and taken away, either by the purgation of the Body, or by Repellers, or Discussives, or cutting and lancing, or lastly, even by actual Cauteries and burning; for as for the milder sort of Remedies, it sleights and contemns them; and as for the stronger sort of Medicaments, it is by them exasperated.

2. Where there are secret and hidden Cancers, there it is best not to cure them; For they that are cured die within a very short time after, but those that are not cured of these aforesaid Cancers live a longer time, so saith *Hippocrates*, in the sixth of his Aphorisms, Aphor. 38. For why, those Cancers that before were not exulcerated when they have Medicaments applied to them may and do easily become exulcerated.

3. They likewise that have Cancers in the Cavity of the Body, or in the palate of the mouth, or in the Buttocks, or in the Womb, if they be either cut or burnt, the Ulcers cannot by any means be healed up, and covered over with a Cicatrice. But those that are thus affected while they lie under Cure are tortured and tormented (even to death) by the afflicting pain they undergo; whereas without a Cure (and if they shall not at all submit themselves unto the means tending thereunto) they may live a longer time, and with far less trouble and grievance; as *Galen* hath it in his Commentary upon the aforesaid Aphorism of *Hippocrates*.

4. Those Cancers only therefore are to be attempted in the way of Cure, which are and appear in the outward part of the Body; and there likewise it will be more safe to attempt the Curing of them by Medicaments in the very first rise of them (while they are yet but smal and inconsiderable) than when they are grown and become great; for then they are not to be cured without the help of the Hand; (which we term the Manual

nual operation) neither indeed so, unless they have their residence and situation in those parts that may without danger be lanced and burnt, together with the very Roots, that is to say, the Veins in them that are full of burnt or adust blood.

5. For when the Cancer hath once gotten possession of a great part; or when it sticketh fast in a more noble part, or any other that may not safely and conveniently be cut or burnt, it is then altogether incurable.

6. Yea moreover, (in the general) there are very many, and indeed the most Physicians, that are of opinion, that no Cancer confirmed and exulcerated can possibly be cured.

And it is oftentimes observed, That although Cancers be cut out, and now and then cured in the external parts; Yet notwithstanding, that the same have returned again either in the very same part, or else even in some other parts; as for instance, when the Cancer hath been cured in the paps or breasts another hath soon after risen and sprung up in the Womb. And therefore we ought rather, so far forth (and no further) to cure those Cancers that are already inveterate, and of the greater size, that their further growth and augmentation may be impeded and hindered.

Whether an exulcerated Cancer be contagious?

Zacutus Lusitanus will have it to be contagious; & he proveth it,

1. From Reason.

Cardanus in his first Book of Poysons, and 12. Chapter, affirmeth that the Cancer is not contagious; and yet he giveth us no reason at al for this his Assertion; but presupposeth, and taketh it for granted, as a thing apparent and manifest. Neither (to my best remembrance) do I know any one, who accounteth and esteemeth the Cancer to be in the number of contagious Diseases; excepting only *Zacutus Lusitanus*, in the first Book of his Practice, and Administr. of Physick, and 124. Observat. who doth it, and endeavoreth to prove it both by Reason and Experience. His Reasons are, 1. Because that in an exulcerated Cancer there is present a certain putridness and noysom stench (as it were of a dead Carkass) that by its purulency infecteth the body that is nigh unto it. His second Reason is, Because the Cancer is the same Disease with an *Elephantiasis*, and Leprosie of one only Member; but now the *Elephantiasis* is most contagious.

An Answer thereto.

But these his Reasons do not sufficiently conclude any thing. For first, Al things that are putrid and ill savoured and noysom are not contagious. For in a Gangrene and *Sphacelus* there is an extraordinary putridness and stench; and yet notwithstanding the stander by is not therewith infected. And moreover, although a Cancer hath some kind of similitude and resemblance with an *Elephantiasis*; they are yet notwithstanding several and different affects, as *Cardanus* in the place alleadged hath very rightly determined.

2. From Experience.

And therefore Experience is to be consulted. Now *Zacutus Lusitanus* in the place before alleadged bringeth in and produceth this Experience: He there writeth, That a certain poor woman having had a Cancer exulcerated in her Breast for many yeers together, and lying in bed with her three sons, they were all infected with the like contagion; & that she after five yeers dying, two of these her three sons seized upon and dispatcht by this Disease departed this life; but the third (somwhat stronger of constitution than the other two) after that the Cancer had been cut away by the hand of the Chirurgeon, with much pains and ado was cured and healed. But this being but one example, Experience is yet further to be consulted: and the rather in regard that it may be here objected, that those her sons might contract this Disease, not by contagion, but from an hereditary infection.

An Answer to the aforesaid Experience.

The Cure.

As for what therefore concerneth the Cure of a Cancer not exulcerated, in the very first place (and this indeed is generally to be practised in al Cancers whatsoever) before any thing else be done, we are to use our diligent endeavor to prevent the encrease of black Choler, and that none be generated for the future; and that what is already in the body may speedily be evacuated. The breeding of black Choler and the Melancholy Humor is to be hindered and prevented by the Patients abstaining from those Meats that may any way yield and afford matter to the black Humor; such as are al things that are thick, feculent, salt, bitter; and such are old cheese, flesh that is thick, old, salt, or smoak-dried, Garlick, Onions, Mustard, Pepper, and al other Spices. Let the sick person likewise shun and avoid al those things that do any way conduce to the generating of the black Humor; such as are Grief, and sadness of the heart, overmuch watching and want of rest, and the like. But rather let the Patient use a Diet that is moderately moistening and cooling; viz. Ptisan of Barley, Lettice, Mallows, Borrage, Succory, the four cold Seeds, Veal, Wether Mutton, Kids flesh, Chickens, Reer Eggs, River fish, the Whey of Goats Milk, and such like.

Further-

Furthermore, If there be any aduſt Humor already generated in the Body, let it be with al ſpeed evacuated. And therefore in the firſt place (if it be at al requiſite) blood may be drawn forth by opening a Vein. In Women, the provoking and bringing down their Courſes wil be moſt proper and convenient; and in men let the Hemorrhoids be opened, if it may be done. After this, let the body be throughly purged with thoſe Medicaments that evacuate the black aduſt Humor; among which there is eſpecially commended Epithymum, (we vulgarly cal it Mother of Tyme) black Hellebore, Fumitory; and the Compounds thence derived, viz. the Pils of Fumitory, and the Confection Hamech. But now that the Purgation may the better ſucceed, that thick and groſs Humor is firſt of al to be prepared; yea moreover, whenas the whol Humor may not at once and al together be evacuated, then the Purgers and Preparers are often to be repeated, by turns, and ſucceſſively. Now for this Affect, thoſe things that are very proper and convenient, are, the Syrup of Apples, of Fumitory, of the Juyce of Borrage and Bugloſs, Syrup of Lupulus or the Hop: or other Compound Medicaments like unto theſe. Neither wil it be amiſs, or any whit incongruous, likewiſe to ſtrengthen the Heart and the Liver; and if there be any diſtemper chanced unto either or both of them, to amend and rectifie it by Medicaments, of Borrage, Bugloſs, Roſes, Citrons, Sanders, Corals, Margarites, Pearls, and thoſe other Medicaments that are made and compounded out of theſe.

And then in the next place, we are to apply our ſelves unto the very part affected; And, 1. By Topicks the Matter that hath flown in is a little to be driven back again, and diſcuſſed; and the part is to be confirmed and ſtrengthened; and thoſe Medicaments that have in them a power and vertue of Repreſſing, Corroborating, and Diſcuſſing, are to be applied. For by this means, ſo much of the Cancer as is already generated is quite taken away; and likewiſe the further growth and increaſe thereof is prevented. But now, let thoſe Medicaments have in them a mediocrity (or mean) of ſtrength and vertue; and let them not be ſharp and biting. For if the Medicaments be over weak, they then afford no help or benefit; and again, if they be too ſtrong and violent, they then indeed either repreſs or diſcuſs the more thin parts; but for the more thick, they do not only leave them behind, but alſo render them the more unapt and unfit to be afterwards diſcuſſed and diſſipated. There is for this uſe and purpoſe very convenient, the Decoction or Juyce of Nightſhade, and of the ſeveral Species of Endive and Succory. But more eſpecially there are commended the Cockle-fiſh boyled, River Crabs or Creviſhes; and principally green Frogs, out of which there is a moſt excellent Oyl to be diſtilled, for the moderating of the pain, and the healing of the Cancer; the deſtillation is by deſcent, after this manner:

Take *Green Frogs, living either in the Reeds, or in pure and cleer Waters; fil their mouths with Butter, and afterward put them into an Earthen Pot that is glazed, and having in its bottom many little holes. Let this Pot be put into another Pot, and that other Pot put into and ſurrounded with the Earth, in the which it is to be as it were ſhut up: and then let as wel the Pot that hath the Cover, as that Pot which is put into it be carefully luted and ſtopt; that ſo nothing may exhale. Afterward, let the fire be kindled round about the Pot on every ſide; and the Oyl wil deſtil into the lower pot, which is to be taken forth, and together with the Pouder of the Frogs mingled, for the making of an Unguent.*

Others there are that make up an Unguent with the Aſhes of Crabs or Crawfiſh mingled together with Coriander ſeed, and the Oyl of Roſes. And here likewiſe we are to make uſe of the greateſt part of Metallicks waſhed, and ſo becoming altogether without any biting quality (their power and vertue being here of ſingular uſe:) ſuch as are Lead, Tutia or Pompholyx, Litharge, Ceruſs, Antimony. Lead is chiefly and moſt highly commended by al; and it may likewiſe be adminiſtred any manner of way. Whereupon it is that al thoſe Medicaments that are to be applied in the Cancer are moſt fitly and properly made up in a Leaden Mortar, with a Leaden Peſtle, touching which *Galen* is to be conſulted; ſee in his 9 Book of the Faculty of ſimple Medicaments, and the Chapter of Lead; which is made by rubbing together two Leaden Plates (whereon the Oyl of Roſes hath been poured) ſo long until the Oyl become ſomwhat blackiſh, and that it hath gotten the conſiſtence of a Liniment; or if in a Leaden Mortar the Oyl of Roſes be ſtirred about with a Leaden Peſtle, ſo long, that it likewiſe wax ſomthing black, and become thick. Or,

Take *Oyl of Roſes two ounces; the Juyce of Nightſhade an ounce and half; Ceruſs or white Lead waſhed, Lead burnt and waſhed, of each one dram: Litharge, Frankincenſe, Pompholyx or the ſoyl of Braſs, of each half a dram; White Wax as much as wil ſerve the turn: make an Unguent.* Or,

Take *Terra Sigillata or the Sealed Earth of Lemnos, Bole-armenick, Ceruſs, of each half an ounce; Tutia prepared two drams: Pouder of green Frogs three drams: Litharge one dram and half; Oyl of Roſes an ounce and half; Oyl of Frogs an ounce; Vinegar ſix drams; Wax a ſufficient quantity: ſhake and ſtir them about for a good while in a Leaden Mortar, and ſo make an Unguent.*

And indeed this is the ſafer way of curing Cancers that lie hid and ſecret in the body, and ſuch as are not as yet exulcerated. For albeit *Avicen*

command

command that the leſſer ſort of Cancers (and ſuch as may be perceived) be cut up by the very roots, and after this exciſion that the thicker blood ſhould be preſſed and ſqueezed forth on al ſides, and round about, and that the place be afterward ſeared and burnt with a Cautery, that ſo by this ſaid burning the reliques or remainders may be conſumed, the Member ſtrengthened, and the Hemorrhage or flux of blood hindered; yet notwithſtanding this kind of Cure hath much danger in it; and we ought here to remember that above alleadged 38. Aphoriſm, Section 6. For the Cancer (eſpecially if any thing great) if it be wholly cut forth, and as it were ſtub'd up by the roots, then inſtantly there wil follow thereupon (the Veins and Arteries being cut aſunder) an extraordinary and dangerous flux of blood; which if it be intercepted with a binder, then there wil be an extraordinary great and grievous pain excited in the other parts; if they be ſeared and burnt, this likewiſe cannot be done without much inconvenience; and yet nevertheleſs there wil be great danger of its returning.

The Cure of an exulcerated Cancer.

But now, whereas the moſt are of Opinion that the exulcerated Cancer is not at al to be attempted or medled with, yet notwithſtanding it being very inhumane to leave the ſick perſon (even in ſuch a Diſeaſe) altogether deſtitute of help and aſſiſtance, there is therefore by Phyſitians appointed and ſet down a twofold way and method of curing theſe exulcerated Cancers; the one true and genuine, which tendeth to the removal of the very Cancer it ſelf; the other only Palliative (as they term it) which eaſeth, aſſwageth, and in ſome ſort qualifieth the Cancer, ſo that the ſick perſon may live with ſomwhat the leſs pain and grievance. The true Cure is performed either by Inciſion, or Searing, or burning Medicaments; which indeed are moſt eſpecially to be adminiſtred, if the Cancer hath not yet attained unto any conſiderable growth and bigneſs; or elſe if it be in thoſe parts where it may without danger be cut forth, or burnt. It may be amputated and cut away even to the very quick, that ſo whatſoever is vitious and corrupt may be wholly taken away, ſo that there may be no fear left of any remaining contagion. And ſomtimes only cutting wil ſuffice, and by it the whol Cancer may be grubb'd up even by the very roots. The amputation being made, the blood is not to be ſuppreſſed and ſtopt from flowing, before it ſhal manifeſtly appear that al thereof that is vitious and corrupt be flown forth out of the Veins: afterwards dry Liniments are to be put upon the part that was cut, and the Ulcer is to be concocted or ripened, cleanſed, filled up with fleſh, and a Cicatrice drawn over it, and ſo the Vein to be ſhut up. But ſomtimes again, if the Cancer be overgreat, and black Choler hath likewiſe ſeized upon the greater and deeper Veſſels, then in this caſe Section alone wil not ſuffice, but beſides the ſaid cutting burning is alſo to be adminiſtred. And therefore in the firſt place, that Skin being taken off, the Cancerous part it ſelf, together with al the blackiſh Veins, is as much as poſſibly may be to be taken forth, and the blood likewiſe (according to the ſtrength of the Patient) is not inſtantly to be ſuppreſſed and ſtopt, but rather to be further preſſed and ſqueezed forth, that ſo al the black Choler may by this means flow forth of the Veins. After this the place is to be ſeared with a fire-hot Iron, that ſo the Hemorrhage and bleeding may thereby be ſtanched, and the reliques of the malignant matter waſted and conſumed. And at length thoſe things that take away the cruſt, cleanſe the Ulcer, generate and breed fleſh, and produce a Cicatrice, are to be adminiſtred. But others (leſt that the ſick perſon ſhould be endangered by the Hemorrhage and extream bleeding, or together with the loſs of his blood ſhould loſe his life alſo, and leſt the Chirurgeon by the flux of blood might likewiſe be hindered in his operation) do not in the like manner as aforeſaid amputate the whol Cancer, and after that at length burn the whol; but firſt of al they cut off a certain part thereof, and then (after that a ſufficient quantity and portion of the blood is flown forth) they burn and ſear the ſaid part; and then again a ſecond time they amputate and cut off another part thereof, and again burn it; and thus in this manner, by turns iterating and repeating the Section and amputation, as alſo the burning and ſearing, they do at length quite take away the whol part affected with the Cancer. The Cancer may alſo be burnt with Cauſtick Medicaments, among which there is commended Sublimate Arſenick. But there ought to be a ſpecial regard had unto the places and parts that lie round about it; neither in this reſpect may crude Arſenick be (without much hazard and danger) thus adminiſtred. That Arſenick is more ſafe that is poured forth mingled, and fixed with *Salnitre*, or the Salt of Nitre.

But now, in regard that the great fear that here eſpecially perplexeth Phyſitians is touching the recidivation and return of the Affect, thoſe Medicaments therefore that evacuate black Choler are often to be repeated, and likewiſe thoſe that have in them a power and vertue to draw forth the Hemorrhoids, and the Courſes. Inſtead of which (if they be wanting) ſome there be that cauſe Iſſues to be made. But in this caſe, we are not only to adminiſter ſuch Medicaments as prepare and purge forth black Choler, but thoſe likewiſe that reſiſt and oppoſe poyſons, and ſuch as are known to be expedient in regard of their whol ſubſtance, and ſuch as have in them the property and ſovereign vertue of Antidotes. And for this purpoſe we are to adminiſter Treacle and Mithridate, with Borrage, Cichory, and the Juyce or Syrup of Sorrel, the Broth of River Crabs out of Aſſes Milk, and

and the Antidote likewise that is made of their Blood.

Antonius Chalmetæus (in all kind of Cancers) commendeth this Water; which he likewise useth nine daies before the excision, or cutting forth of the Cancer.

Take *Thapsus barbatus or sweet white Mullein, the Root of Water Betony, of each two ounces; Dropwort, Spleenwort, Agrimony, Tormentil, Scabious, Avens, Toad-flax, of each one handful; Nettle seed three drams, Flowers of Elder, Rosemary flowers, of each one pugil or smal handful.* Make a Decoction, which may be dulcified with Sugar; with some part of which Decoction the place affected may be likewise fomented, and throughly washed, and afterward a *Magma* or sweet Confection may be applied in the form of a Cataplasm.

The other way of curing the Cancer is that that we cal a Counterfeit or Palliative Cure; by which we only use our endeavor that the Cancer may not be augmented and get any further growth; and that the pain thereof may be asswaged; that so the sick Person may lengthen out, and lead the remainder of his life with the less excruciating and afflicting misery. Such Medicaments are those that do not putrifie, neither corrode and bite the part, but do moderately dry and cool it; and they are such as are above mentioned; and more of them you may likewise see in the fourth Book of our Practise, Sect. 3. Part 1. Chap. 7.

Lupus *or the Wolf, and* Noli me tangere.

There may be referred unto a Cancer (or at least, certainly, thereunto subjoyned) those Tumors or Ulcers which they vulgarly call, *Noli me tangere*, and *Lupus*, the Wolf.

Now some there are that divide the Cancer into three Species or kinds; into the Cancer that is by the Greeks & Romans absolutely and specifically so called, and which is commonly and wel known by that name; into the *Noli me tangere*, and the Wolf. And they then only term it *Noli me tangere*, when there ariseth a Tumor or Ulcer upon the Chin, and especially about the Mouth and Nose, bearing a resemblance with, and being very like unto an exulcerated Cancer, growing and increasing very slowly at the beginning; which (as *Theodoricus* truly telleth us) continueth for one whol yeer no bigger than a Pustule, and is as it were a very smal and inconsiderable Push; and which afterwards and at all times creepeth less than the Cancer: and *Rogerius* in his fifth Chapter writeth, that the Cancer doth corrode more in one day, than *Noli me tangere* doth in a Month. And it is so called, either because it ought not to be rubbed (since the more it is handled and rub'd the worse it becomes) or else in regard that it is a Contagious Malady; or else lastly, because it is rather exasperated then mitigated by Remedies, and is thereby caused to creep into the sound parts.

But they cal it *Lupus* or the Wolf, if it be in the Shins, Ankle-bones, and Thighs. But in all other parts of the Body, although it retein stil the same pravity and malignancy, they conceive that it is not to be absolutely called *Lupus*. Yet notwithstanding (when it ariseth and appeareth in the midst of the Body) others term it *Cingulus*, a Girdle; as *Guido* tels us in his Serm. 7. Tract. 4. Summ. 1. Chap. 24. but it is so named by reason of its vehement corrosion, and eating through. The vulgar People likewise wil have it to be from hence so called, to wit, because like unto a hunger-starved Wolf it consumeth the Flesh of Hens, yea and other flesh also. This Opinion is indeed by *Joh. Philip. Ingrassias* exploded, and termed a fatuity and vain foppery. But that some such thing there is done, is related and asserted by divers, and it is confirmed by the History that *Mauritius Cordæus* relateth in his first Book, Comment. 7. upon *Hippocrates*, touching Women. *There was* (saith he) *a certain Noble and Choice Woman, living nigh unto the Castle of* Nenve, *that had all the right side of her Face possessed and overspread with a* Cancer, *and that likewise exulcerated of a long time, insomuch that her Face was most grievously tortured with pains and griefs of all sorts. She having in vain and to no purpose at all sought for help unto the Physitians, as wel French and Italian, as Spanish and Germans (together with other forreign Physitians) was at length perfectly cured by this following expedite and speedy Remedy that she had learned of an ordinary and vulgar Barber Chirurgeon. She cuts Chickens into very smal and broad pieces, the which she dayly applied unto the part affected, oftentimes changing and renewing them: and at length by this one only Remedy she recovered her former perfect health and soundness.*

Menardus (in his seventh Book, Chap. 1.) referreth the Tumor *Lupus* or Wolf, and likewise the *Noli me tangere*, both of them to the Tumor *Phagedenæ*.

Chap. 21. *Of a Watry Tumor.*

THere arise in like manner from a Watrish and wheyish humor divers kinds of Tumors; and from this humor it is, that somtimes certain parts of the Body, and somtimes again the whol Body is caused to swel up; of this nature and kind, are the Dropsie, *Hydrocephalus* or Head-Dropsie, Dropsie of the Lungs and Chest, *Hydromphalus*, *Hydrocele*, Dropsie of the Womb, &c. touching all which having already treated in their proper places, we wil here speak somwhat only in general concerning a watery Tumor.

The Causes.

The Cause (to wit, the next and immediate) of watry Tumors, is the collecting or gathering together of a watry or wheyish humor in some one or more parts. But now from what causes these watery & wheyish humors proceed and come to be gathered together, we have already declared where we treated of the *Hydrops* or Dropsie. Now for the place, the watry and wheyish humor is collected in some part that is loose, or that hath in it a Cavity or hollowness.

Signs Diagnostick.

These watery Tumors are soft, lax or loose, and without pain. If they be pressed and thrust down, the print of the finger that maketh the Impression doth not remain: and if we view them wel either by day-light, or Candle-light, they appear transparent, and such as may welnigh be seen through.

Prognosticks.

1. The very watry Tumors themselves that are fomented and cherished by some vice or default in any of the Bowels are not at all dangerous.

2. But those that have their original from somthing amiss either in the Liver, or in the Spleen, although they are not in themselves dangerous, yet they do notwithstanding threaten danger, in regard of the Bowels that are ill affected.

3. Although watry Tumors are not dangerous; yet notwithstanding they are not easily cured, since that the humor is hardly or not at all to be concocted, and is likewise discussed very slowly.

The Cure.

That so the Cure may rightly be performed, the the watry humor which causeth and cherisheth the Tumor is to be evacuated and emptied forth; and speciall care must be taken that no more of it be generated in the Body for the future, and the humor it self that is in the part affected is to be evacuated.

In the first place therefore, the watry and wheyish humors are to be evacuated by Stool, by Urine, and by Sweats; and we must likewise so order it, that the *Diaphoresis* and insensible transpiration may be free and uninterrupted.

Secondly, If there be present any fault in any Bowel that is by Nature destin'd and ordained for Concoction (by which this watry humor is supplied) this is to be corrected; and of this we have already spoken in its proper place.

Thirdly, The watery matter (the next and conteining Cause of the Tumor) is to be evacuated; which is to be performed, either insensibly by those things that Resolve and digest, and dry much; or else sensibly, by opening the Tumor, and pouring out the Matter. Those things that Resolve, Discuss, and dry up the watry humors, are, Rue, Wallwort or Danewort, Elder, Camomile, Dill, the Flower-de-luce root, Aristolochy or Birthwort, Laurel berries, the Meal of Beans, and of the bitter Vetch *Orobus*, Ashes, Salt, Sulphur, Ammoniacum, and Bdellium. As,

Take *Leaves of Rue, of the Elder Tree, and Wallwort, the Flowers of Camomile, of each one handful; Lawrel berries two ounces; boyl them in Ley and Wine, for a Fomentation.* Afterward.

Take *Sal Nitre half an ounce, Sulphur three drams, the Pouder of Lawrel berries one ounce, Ammoniacum half an ounce, Oyl of Rue and Wax, of each as much as will suffice; and make a Liniment.*

But if the matter cannot be discussed and scatterred, then let the Tumor be opened, and the mater emptied forth.

The Diet.

Let such a Diet be ordained and appointed that may not in the least make any supply, or add unto the watry humors; and let it have regard unto the Causes of the collection of the watry humor; touching which we have also already spoken in its proper place.

Chap. 22. *Of* Exanthemata, Ecchymata, Papulæ, Pustulæ, Phlyctenæ, *and* Eczesmata.

BUt now it is very rare (and a thing that but seldom happeneth) that one only humor should excite and cause any Tumor whatsoever; but for the most part, many humors mixed together, and especially the Cholerick, Salt, and serous or wheyish humors, meeting together (and somtimes also black Choler) do excite and produce divers sorts of Tubercles or small Tumors; of which we intend now to treat; and here in the explanation of their several names, we meet with much difficulty. And first of all, *Exanthemata*, and *Exanthesis* (that is to say, Effloreſcences) are so called, in regard that like unto Flowers they break forth in the Skin. *Hippocrates* 3. Epid. Comm. Text 51. calleth them likewise *Ecthymata*, from the Greek, because they impetuously break forth, as *Galen* in his Comment upon *Hippocrates* explaineth it. *Pliny* (in his Book 24. and Chap. 4. and Book 26. Chap 11.) calleth them *Eruptiones*. But now the name [*Exanthemata*] seemeth to be a general name; so that it may comprehend under it whatsoever of its own accord breaketh forth in the Skin; neither indeed is there any certain and particular species of those Tubercles or smal Tumors, whereupon it is that they are likewise called *Exanthemata Sublime* broad,

Exanthemata.

broad, red, round, smal, *Exanthemata* of sweats, *Elcode*, by *Hippocrates* in his third Book of Aphorisms, Aphor. 20. But whether or no there be any general Latin word that may answer unto this *Exanthemata* of the Greeks, I very much question. We indeed meet with the name of *Papulæ*, and *Pustulæ*, that is to say, Wheals, Blisters, Measels, and Pushes. But now whereas there is a twofold sort of *Exanthemata*, one that which only changeth the color of the Skin (as it is wont to be in those Feavers that we cal *Petechiales*;) and another, in which there are certain Tubercles breaking forth in the Skin, the name of *Papulæ* and *Pustulæ* seemeth not to agree with, and answer to both of them, but only unto the latter sort of the *Exanthemata*; for *Papulæ* and *Pustulæ* signifie only Tubercles in which there is some certain humor contained. And yet notwithstanding we find that the name of *Papulæ* is a more special name; and that it seemeth not to be used by *Celsus* and *Pliny*, in one and the same manner. For by *Pliny* the hotter sort of *Exanthemata*, and which are elevated higher than ordinary into a sharp-pointed head, are termed *Papulæ*; of which notwithstanding seeing that there are many differences (viz. red, hot, black, *Papulæ* of sweats) this name seemeth to be general enough. But now with *Celsus* the name *Papulæ* is a special and peculiar name, and signifieth only that affect which the Greeks cal *Lichenes*, and the Latines *Impetigo*. For thus he writeth (in his fifth Book, and 28. Chapter) That the *Papulæ* by the smalest sort of Pustules do exasperate the Skin, and likewise that they corrode and creep forward but slowly; and that where the Disease beginneth round, there it also proceedeth after an Orn-like and round manner; and that that which is less round is more difficultly cured; and that (unless it be taken quite away) it turneth into the *Impetigo*. For he maketh two species of *Lichenes*, as the Greeks likewise do. One he termeth *Agria*, that is, wild; the other more mild; and that the wild *Papula* is cured by rubbing it with fasting Spittle. All which things before mentioned agree with the *Lichenes* of the Greeks.

The name likewise of *Eczesmata* seemeth to be general. For although some by these *Eczesmata* understand only *Hidroa*, or *Sudamina*; and others refer them unto the Head alone; yet without al doubt this name is general, and signifieth a Pustule, or very hot *Papula*, as the name it self importeth.

Of the Tumors Phlyctænæ.

But that we may treat of these in their several species or kinds; the first in order to be handled are those we cal *Phlyctænæ*. Now they are called *Phlyctænæ*, *Phluctides*, *Phluzacia*, and *Phlusis* (from two Greek words that signifie to Boyl or become fervent hot) being Pustules, and little Bladders, excited and caused by the humors when they are as it were boyling hot, and most sharp; like unto those Pushes and smal Bladders that are raised by the fire, and scalding hot water. By others they are likewise named *Ignis Silvestris*, or wild fire. The Arabians cal them *Sabafati*. And indeed these kind of Pustules and little Bladders very frequently break out in the Skin, or rather in the Scarf-skin; and sometimes privily in the *Cornea* Tunicle of the Eye; touching which we have already spoken in the first Book of our Practice, Part 3. Sect. 2. Chap. 17. They oftentimes arise in the Thighs; and in Infants they sometimes break forth in their whol body; but seldom so in men.

The Causes.

The *Phlyctænæ* proceed from a Cholerick and extream hot humor, mingled together with a humor that is salt and wheyish. But now from what Causes such like humors are generated, we have elsewhere declared. They sometimes likewise befal women, by reason of their Menstruous blood over long retained and corrupted. But now those Humors are called forth unto the Skin, when any one having been in the cold suddenly approacheth neer unto the fire, or else betaketh himself to a hot Bath; and so on the contrary, when after heat the pores of the Skin shal be altogether close shut up by the external cold.

The Signs Diagnostick.

The little Bladders that resemble those that are raised by the fire or scalding hot water do suddenly break forth; and when they are broken, there issueth forth by little and little a yellowish humor: the Crusts thereof wax hard, and then they fal off. By reason of the acrimony and fervent heat of the humor they excite an itching in the Skin.

Prognosticks.

1. *Phlyctænæ* (as *Aetius* tels us, Tetrab. 4. Serm. 2. Chap. 63.) abide and continue sometimes for two or three daies.

2. *Phlyctænæ* if they be not wel and rightly cured, they now and then degenerate into an *Herpes*.

The Cure.

If such like vitious humors abound in the body, then (in the first place) such a kind and course of Diet is to be prescribed that wil not encrease those like Humors, but such as may rather correct that Cacochymy. And moreover, the said vitious Humors are by convenient Medicaments to be evacuated.

Now as for Topicks, let the *Phlyctænæ* first be fomented with the Decoction of Lentils, Myrtle, and Pomegranate Rinds. Or,

Take *the Mucilage of Fleabane or Fleawort*

seed, Rose water extract six ounces; the Juyce of Purslane, and Nightshade, of each two ounces: mingle them, and let the place affected be anointed therewith.

If they break not of their own accord, and thereupon cause a grievous pain, they are then to be prickt and pierced through with a needle; and the Pustules are to be hard squeezed; and upon the Ulcer lay this following Cataplasm:

Take *Barley Meal, the Meal of Lentils, and of Beans, the pouder of Pomegranate Rinds, of each an ounce; with a sufficient quantity of the Oyl of Roses make a Cataplasm.* Or,

Take *the Leaves of Plantane, Mallows, Myrtle, of each one handful; boyl them to a softness, and pass them through a hair sieve; then add unto them Barley Meal, the Meal of Lentiles, and crums of white Bread, of each as much as will suffice, and make a Cataplasm.*

Or else let a Liniment made of Swines Fat, with the Spume or Froth of Silver, in a Leaden Mortar, be laid on. Or,

Take *Juyce of the Root of sowr Sorrel, and Scabious, of each two ounces; Oyl of Roses four ounces; the Fat of an old Hog six ounces; boyl them until the Juyces be consumed; and afterwards add Litharge of Gold one ounce; live Sulphur six drams; Turpentine half an ounce; stir them wel together in a Leaden Mortar, and make a Liniment.* Or,

Take *Litharge, live Sulphur, Myrtle Pouder, of each one ounce; stir them wel together with Vinegar in a Leaden Mortar; and adding thereto a sufficient quantity of the Oyl of Roses, make an Unguent.*

See more of this in *Aetius*, Tetrab. 1. Serm. 4. Chap. 21.

Chap. 23. *Of* Vari *or Pimples.*

Vari are Tubercles or little Swellings somwhat neer of kin unto *Psydracia*, by the Greeks called *Fonthoi*, because that like unto Dung they are the defilement and the disgrace of the Countenance, by fouling and disfiguring of the Face. *Galen* in his second Book of the Method of Physick, Chap. 2. reckons up these among those names that neither represent the place affected, neither the cause that produceth them. They are likewise by some named *Acne* or *Acna*, as *Aetius* tels us, Tetrab. 2. Serm. 4. Chap. 13. Although *Hermolaus* in his Gloss upon *Pliny* reads the word *Acmas*, as if this kind of Affect were commonly so termed by the Greeks, in regard that it is wont to seize upon those that are of ripe and ful age. *Celsus* in his fifth Book, Chap. 6. writeth thus: *It is almost but a meer folly* (saith he) *to attempt the curing of these* Vari *or Specks, and Pimples in the Face, or the little Pushes and beat-wheals of the same. But* Vari *and Lenticulæ or Pimples, are very wel and commonly known: and yet notwithstanding you cannot possibly take from Women the care they take in tricking themselves up, and especially in trimming their Faces.* In *Galens* Opinion (as we have it in his fifth Book of the Composition of Medicaments according to the place, Chap. 3. and in his Book of making those Remedies that may be provided, Chap. 51.) *Fonthos* is an hard and little swelling in the Skin of the Face, raised from a thick Juyce that is there gotten together. The which in regard that it is altogether void of the wheyish moisture, it is therefore not at al itching, neither doth it require or stand in any need of scratching.

This Humor is for the most part alimentary, insinuating it self into the Pores of the Skin. But yet there is likewise oftentimes therewithal mingled an excrementitious Humor, and atrabiliary blood.

Signs Diagnostick.

We have before told you out of *Celsus*, that this Tumor is sufficiently and commonly known.

Prognosticks.

1. This Affect hath in it no danger; so that *Celsus* thinks it meer folly so much as to will or desire the Cure of this Tumor.

2. Those *Vari* that arise only from the thicker and grosser Aliment, are firm and stable. But if an Excrementitious Humor be mingled with them, the Tubercles pour forth an Ichor or thin Excrement; and if they be suppurated they turn into Ulcers.

3. If together with the Pushes there be an Intense and extraordinary redness in the face, the Malady is then very hard to be cured, if not altogether impossible: and although the Pustules may be removed by strong Medicaments, yet the redness wil notwithstanding remain, and encrease unto a higher pitch.

4. When there is a redness conjoyned with the swelling and puffing up of the Face, and a hoarsness of the voyce, this is a very shrewd sign of an approaching Lepra, or Leprosie.

The Cure.

These Tubercles are to be cured by Emollients, Discussers, and likewise (unless they in a short time yield and give place) by corroding Medicaments. As for instance,

Take *Meal of Lupines, of the bitter Vetch Orobus, of each one ounce and half; of Mallows peeled, and Flowerdeluce Root, of each two drams; Salt Ammoniack one dram; with Mucilage of Gum Tragacanth make Trochisques, which at the time of using them may be dissolved in Milk.* Or,

Take *Honey, and the sharpest or sowrest Vinegar, of each one ounce and half. Mingle them.* Or,

Take

Take *Litharge of Gold three drams*; *Turpentine half an ounce*; *common Oyl as much as will suffice*: *mingle them.* Or,

Let the Face be anointed in the Evening with bitter Almonds wel pounded and made into a Mash, and so mingled with Vinegar; and in the morning wash the Face with Milk.

If the *Vari* be harder than ordinary,

Take *Black Soap half an ounce*; *Ammoniacum, Frankincense, of each a dram and half*; *let them be dissolved in Water, that they may get the thickness of a Cerote.* Or,

Take *the Juyce of the sharp Dock two ounces*; *Vinegar of Squils half an ounce*; *Gum Ammoniack dissolved in Vinegar two drams*; *Borax a dram and half*; *Allum half a dram*; *mingle them, &c.* Or,

Take *the Root of sowr Sorrel, and Elecampane cut into smal pieces, of each one ounce*; *Hyssop and Penyroyal Leaves, of each half an ounce*; *boyl them in Vinegar until they be soft and tender, and then bruise them very smal. Add hereto of soft Soap half an ounce*; *Ammoniack dissolved in Vinegar two drams*; *Myrrh, Frankincense, Borax, of each half a dram*: *mingle them.*

Chap. 24. *Of* Sudamina, *and* Sirones.

SUdamina (which the Greeks cal *Hidroa*, and likewise *Exanthemata*) are with us those Efflorescences or Pushes, or Wheals that stick and have their residence in the utmost Skin of the body, like unto the grains of Millet, that by their exulceration do exasperate the Skin. Some there are that wil likewise have them to be called *Ecxesmata*. By *Pliny* in his third Book, and Chap. 4. they are termed *Papulæ Sudorum*, or sweating Pustules. *Rhases* and *Avicen* name them *Asef*, or else (with the Article) *Alasef*, or *Hasef*, and *Alhasef*. It is an Affect that is very common and familiar unto Children and yong persons (especially those that are of a hot temperament and constitution, and such as in the hot Summer time use overmuch motion and exercise) happening and arising in the Neck, Shoulder-blades, Breast, Arms, and Thighs; but yet notwithstanding more frequently neer about the privy parts, and the Fundament or Arse; whereupon it is that *Hippocrates* in the third of his Aphorisms, Aph. 21.) reckons it up among the Summer Diseases.

The Causes.

Now these *Sudamina* have their original from the many Cholerick and sharp biting sweats that corrode the Skin, and cause a roughness or ruggedness therein, exulcerate after the manner of Ulcers, and excite in the said Skin a certain kind of itching. And they arise more especially in a hot and moist Summer, after the use of those things that are hotter and sharper than ordinary, extream labor and pains, from inhabiting in a place hot and moist, a wind not sufficiently piercing and purifying, overgreat and excessive sweats; and lastly, the filthiness and nastiness of the Apparel.

Signs Diagnostick.

These Tubercles are sufficiently manifest. For in the Skin there appear a roughness, and itching Pustules.

Prognosticks.

The Affect is not in the least dangerous; but for the most part is cured by the help and strength of Nature, without the use and application of any Medicaments.

The Cure.

And therefore let the Patients wearing Apparel be sweet and clean, and let him often shift himself.

If the Affect be mild, gentle, and moderate, it is then cured by only washing with Rose Water, or Plantane Water; unto which notwithstanding there ought to be added a grain or two of Camphire.

But if it be more grievous, and if that Cholerick Humors abound in the Body, they are to be altered and evacuated.

Afterward this Bath is to be made use of:

Take *the Root of sowr Sorrel, and white Lillies, of each half a pound*; *Briony three ounces*; *of these Herbs following*, viz. *of Mallows, Violets, Marsh-mallows, Pellitory of the Wall, Bears-foot, of each one handful*; *Fumitory three handfuls*; *the flowers of the Water-Lilly, Red Roses, and Beans, of each one handful*; *Bran two pound. Boyl them in pure and sweet Water for a Bath.*

After the Bath, if there be occasion let this Unguent be administred:

Take *Oyl of Violets, of Roses, of the Water-Lillies, or as some cal it, the Water-cress, of each half a pound*; *Juyce of* Lemmons *three ounces*; *Litharge one ounce*; *Cerus or white Lead half an ounce*; *Camphire one dram*; *let them be wel stirred together in a Mortar, and make hereof a Liniment.*

Sirones.

Hither likewise belong those Pustules that the Germans cal *Seuren*, that arise either in the hollow of the Hand, or on the soles of the Feet, or both, in the which there lieth hid and secret an exceeding smal sort of Worms under the Scarf-skin, which they term *Sirones*, or *Chirones*. Now the Affect ariseth chiefly in these places, because that the more thick and gross *Ichores* or ulcerous Excrements are in every scabbiness detained and held

held under the Skin which in the aforesaid place is more thick than elsewhere.

Signs.

We may know whether or no these Worms lie hid in the Pustules, if the itch that is here felt be greater than that which is wont to be (at other times) perceived in these places.

These *Chirones* are (for the most part) digged forth with the Needle; and after this (that so they may not be bred anew) the place is to be wel washed with Wine or Vinegar, in which Salt, Alum, or Nitre hath been dissolved; or else with a Ley that is made of the Ashes of Broom Sprigs, or the Boughs of the Oak Tree. After it hath been washed and throughly dried again, let it be anoynted over with this Unguent following, *viz.*

Take the sharp Dock (or as some call it, sowr Sorrel) Scabious, Wormwood, Tansey, the Leaves of Peaches, of the Ash tree, of Henbane, and of the Walnut, of each one handful; let them be al wel and throughly bruised together; and together with those Juyces, take of the Fat or Lard of an old Hog, two pound let them boyl all together until the Juyces be consumed: and afterwards add of Ship Pitch one pound and half; and let the whol be streined through a Cloth; and then,

Take *Myrtle, Frankincense, Mastick, of each two ounces; let them be poudered very smal; and let them be put into the streining; and then let them be moved and stirred about with a Spatula until they have the likeness and consistence of an Unguent.* And whensoever there is any occasion to make use of, and to do and act any thing herewith, then unto six ounces of this Unguent we may add one ounce of Quick-silver, extinguished and killed with fasting Spittle, or shaken together with the white of an Egg, and by this means you may Cure within fifteen daies all kind of Scabbiness whatsoever it be of this Nature, or those *Sirones* that are accompanied with an itching. And thus much may suffice to have been spoken touching these Tumors (or rather Tubercles) *Sudamina* and *Sirones*.

Chap. 25. *Of* Epinyctides, *and* Terminthi.

Epinyctis is so called, because it ariseth in the Night; as *Galen* (in his second Book of the Method of Physick, Chap. 2. and *Celsus* (in his fifth Book, and 28th Chapter) hath informed us. Yet notwithstanding *Paulus Ægineta* (in his 4. Book, Chap. 9.) and *Aetius* Tetrab. 4. Serm. 2. Chap. 61. conceive that they are so called, not because it ariseth in the night, but because in the night time it doth more vehemently excruciate and torment the Party thus affected. But both these reasons may very wel stand together, to wit, that this Tubercle ariseth by night, and that it doth likewise in the night time most grieve & excruciate the Party affected therewith. *Paulus Ægineta* therefore, and *Aetius* (in the places alleadged) define the *Epinyctides* to be small Ulcers breaking forth of their own accord, like unto *Phlyctænæ* or Blisters, somwhat reddish, which being broken there issueth forth a bloody filth and matter. They do not greatly excruciate the Party in the day time; but by night they torture and torment him with a pain that is more then usual in an Ulcer. But yet, although *Paulus* and *Aetius* define *Epinyctides* by litele Ulcers; yet notwithstanding without all doubt they understand Pustules degenerating and turning into Ulcers. Neither are they generated only of Cholerick and bloody filth and corruption, but likewise from other humors also. And therefore *Pliny* in his Book 20. and Chap. 6. calleth them pale and wan Pustules, and such as disquiet in the night time. But *Celsus* in the place alleadged doth most cleerly and plainly describe them, in these words; *It is* (saith he) *the worst of all kind of Pustules, that is called* Epinyctis. *It is wont to be in colour either somwhat pale and wan, or somwhat black, or else white. About this there is also a vehement Inflammation, and within there is found a snotty and nasty exulceration. The colour is like unto its humor from whence it ariseth. The pain that it causeth is greater than its bigness, and transcendeth its magnitude, for it is no bigger then a Bean. And it likewise ariseth in the eminent parts, and most commonly in the night time; for which cause it hath this name* Epinyctis *imposed upon it by the Greeks.*

There are some that conceive these *Epinyctides* to be *Essere* of the *Arabians*; but they are mistaken, as it wil appear by the Chapter following; for *Essere* (unless it be very much scratched and clawed) poureth forth no humor at all.

The Causes.

The Causes of this Tumor are a Salt and wheyish humor, and Flegm, together with which there is sometimes mingled some of the Blood, and Cholerick *Ichor*, and now and then likewise some of the black Choler. From whence also it is that the colour is not alwaies one and the same, and by reason of the Flegm therwith mingled the Pustule being opened there is found within a certain snotty and filthy exulceration. And the Tumor is almost if not altogether such as that which causeth the Carbuncle, but only that there is here no malignity present; neither is the Tumor likewise here so great as it is in a Carbuncle; neither is it (as we told you out of *Celsus*) bigger then a Bean. But that it is more exasperated by night, the Cause hereof is a black humor (that is wont to be moved more in the night) and the nocturnal cold, which shutteth and closeth up the Pores of the Skin.

Signs

Signs Diagnostick.

It is not at all needful that we declare the signs and tokens of this Tumor; since that it may be sufficiently known from the aforementioned description of *Celsus*.

The Prognostick.

To tel you the truth, these Tubercles are not dangerous; and they denote the strength of the expulsive faculty: yet notwithstanding they are very grievous and troublesome by reason of the pain they cause; and they bring restlessness likewise upon the Party in the night time, and they signifie that an adust and vitious Juyce doth superabound in the body.

The Cure.

And therefore the naughty and vitious humor is to be evacuated; and if the blood too much abound, a Vein is then to be opened; and withall there is such a kind of Diet to be prescribed that may not generate and breed an adust humor.

As for Topical Remedies, such a like Bath, or Lotion, may be appointed, *Viz.*

Take *Mallows, Violets, Pellitory of the Wall, Bearsfoot, of each three handfuls; Nightshade one handful; Marshmallow seeds, and the four cold seeds wel bruised, of each one ounce; boyl them in sweet water, for a Bath.*

Paulus and *Aetius* commend the liquor of *Laserpitium*, with salted water, in regard that it drieth without any corrosion at all; as also the Leaves of the Hemlock or Henbane bruised and pounded smal together with Honey; as likewise the Green Coriander, and Nightshade bruised and mingled together; or the Leaves of the Wild Olive bruised. For those Ulcers that spring and arise from Pustules, this following Medicament is very proper and convenient;

Take *Ceruß half an ounce, Litharge one ounce and half; Fenugreek seed half an ounce, Roses two drams, the Juyce of Endive as much as wil suffice; let them be mingled and stirred together until they attain unto the thickness of Honey, or a Liniment: but let there be a careful abstinence from whatsoever is sharp, acid, and salt.*

Terminthus.

Some there are that refer likewise *Terminthus* unto these *Epinyctides*. But it doth not yet sufficiently appear what this Tumor *Terminthus* of the Ancients is properly; but only what we have from *Galen*, who in Epidem. 6. Comment 3. Text. 37. thus writeth; that the name of *Terminthi* doth signifie certain black Pustules, arising especially in the Thighs, derived from the likeness and resemblance they have in figure, colour, and bigness with the fruit of *Terminthi*, that is *Cicers*, (as they vulgarly render it; but as others, and that more rightly, the fruit of the Turpentine Tree.)

Chap. 26. Of Essere.

THere is also a certain kind of Tumor (which we but very seldom meet with in the writings of the Greeks and Latines; but oftentimes mentioned by the *Arabians*, and now & then likewise by the Physitians of our own time, such especially as live neer us in our own Country) which they cal *Essere*, *Sora*, and *Sare*; to wit, when little Tubercles, inclining to a red colour, and somwhat hard, do suddenly and unexpectedly seiz upon the whol Body, together with an extraordinary & troublesom itching; Just as if the Party had been bitten and stung by Bees, or Wasps, or Gnats, or stung with Nettles; and yet notwithstanding so that after a long time they vanish again; & the Skin likewise (without the issuing forth of an ichorous excrement, or any other moisture whatsoever) recovereth its former smoothness and colour. There are some indeed that refer these kind of Tubercles unto the aforesaid *Epinyctides* of the Greeks; but they are herein mistaken. For *Epinyctides* and *Essere* are Tumors altogether differing one from the other; in regard that *Epinyctides* pour forth out of them a certain humor, which *Essere* doth not, but vanisheth without any kind of humor issuing therefrom. Moreover the *Epinyctides* (according to the name they have thereupon Imposed on them) do afflict and grieve the Patient most of all in the night time; but the *Essere* very rarely break forth in the night, but (for the most part) in the day time. The way and Method of Curing them is likewise very various and different.

It is somwhat doubtful whether or no this kind of Tumor was at all known to the *Grecians*; since that we meet not (in any of their writings) with the true and proper kind of this Tumor; neither do they make any the least mention hereof; unless haply there be any that will refer this Tumor *Essere* unto *Exanthemata* that are without any Ulcer.

Serapio in the fifth of his Breviary, and Chap. 8. maketh a twofold sort of this Tumor, differing according to the Nature and quality of their Causes. The one he deriveth from cholerick blood; the other from a salt and nitrous Flegm; but this more rare. Others there are that assert that this kind of Tumor doth arise from an exhalation or vapour of hot fervent Blood, or else the admixture of the Cholerick and Salt humors.

The Causes.

Whosoever knoweth and understandeth the Nature of serous wheyish humors wil not deny that such like Tubercles may possibly be excited from serous or wheyish humors, being such as are sharp and easily moved, and likewise such as without much ado vanish and are discussed. Which appeareth, and may be confirmed even from hence, that

that this Malady may be, and is removed especially by Venesection or blood-letting, which said Venesection doth chiefly and principally qualifie and allay that extream and fervent heat of the serous and wheyish part of the blood. Yet notwithstanding the itch that is somtimes greater, and somtimes less, likewise teacheth us, that there is not one alone difference of this wheyish humor; but that somtimes this said whey is more mild and moderate, and somtimes again more sharp and hot; somtimes thinner, and somtimes thicker; as likewise thus much (which I my self have very often observed) that these Tubercles (while the the Patients are in a hot place) they then break forth and appear, and that when they expose themselves unto a cold Air, the *Effere* then vanish; and as soon again (on the contrary) to bud forth in the cold Air, and to vanish in a hot place: the former whereof seemeth from hence to happen, to wit, because the humor is very thin and moveable, and therefore is instantly driven in again by the cold ambient Air; but the latter, because the Humor is not altogether so movable and thin, but somwhat more thick, which for that very cause cannot transpire in a cold Air; but in a hotter Air it wil transpire or breathe through.

But this wheyish and thin Humor is for the most part generated from the fault of the Liver; which from some preternatural cause is disposed to generate and breed this humor. Now that said Humor waxeth extreamly hot from the Causes Procatartick (as they cal them) that stir and move the blood. And this happeneth likewise in the Winter time, and in cold Regions, rather than in hot.

Signs Diagnostick.

It is easily known by those notes and marks that are above mentioned; to wit, there somtimes goeth before an Ulcerous Lassitude; and then there break forth in the whol body itchy Pustules; as if the party had been pricked by Bees, or stung with Nettles.

The Prognosticks.

1. These Tubercles vanish of their own accord within a very short space, although there be no course taken for the curing of them; and they are not suppurated; neither doth there issue forth of them any humidity at al. And if this should somtimes so happen, yet this chanceth rather by reason of the scratching of them, and also from the vehemency of the Itch (which is extream troublesom to the sick persons) than by means of the Tumor.

2. Somtimes these *Effere* go before Cholerick Feavers; and therefore such as are very frequently molested and grieved with these Tubercles ought not in any case to neglect the Cure, left that they fal into Feavers, and some more grievous Disease.

The Cure.

For the most part, there is no need at al to administer Topicks; but if the fervent heat of the Blood and Humors be (by Venesection and the administring of Medicaments that alter) qualified and kept under, the Tubercles wil then soon vanish, and the smoothness and Natural color will forthwith return unto the Skin. To wit, in the first place a Vein is to be opened, and so much of the blood drawn forth as the state and condition of the body requireth. And afterwards, if there be any need at al thereof, the Cholerick and wheyish Humor is to be drawn forth by Tamarinds, Myrobalans, Rheubarb; afterward let there be administred the Juyce and Syrup of Pomegranates, Ribes, Syrup *de Agresta*, of Varjuyce, Whey; with the Emulsion of the four cold seeds, and the like; Milk tart and sowr, &c. It is likewise very requisite to put the sick person into a Bath of warm Water.

Let his Diet likewise be cooling and moistening.

Chap. 27. *Of* Scabies, *or Scabbiness.*

Scabies or Scabbiness ariseth likewise from adust matter, as doth also the Itch; that is (as it were) a certain *Præludium* and forerunner of Scabbiness, and the like Affects. Now *Scabies* by the Greeks and Latines is called *Psora*, an Affect sufficiently known; in the which there is not only present some kind of foulness and deformity of the body, but a distemper also even of the very Skin, together with a swelling and exulceration; from whence it is, that the actions of the Skin are likewise hurt. But more especially, in the *Scabies* or Scabbiness, the top and utmost part of the Skin is affected; insomuch that out of it (as *Galen* tels us in his fourth upon the Aphorisms, and the 17. Aphor.) there is some such like thing cast forth, that beareth a likeness and resemblance with the casting of Serpents. From whence it likewise differeth from the Itch: for in the Itch there is only a roughness of the Skin, in which there is nothing that fals off notwithstanding the scratching; whereas in the *Scabies* there is not only a roughness of the Skin, but likewise a distemper with a swelling; from which (by scratching) the bran-like bodies are easily and readily separated; and together with them divers *Ichores* likewise, and filthy purulent Excrements.

The Causes.

But what the Cause of the *Scabies* is, in this Authors seem not so wel to agree. *Galen* in his Book of Tumors, Chap. 1. & 3. tels us that *Scabies*

bies alſo, and *Lepra* are Melancholick Affects; and likewiſe in the ſeventh Sect. Aphor. 40. that *Cancers*, *Elephantiaſes*, *Lepra's*, and *Pſora's*, are al of them Melancholy Affects; and the ſame he alſo tels us in other places. But *Avicen* in the ſeventh Book of his fourth Tome, Tract. 3. Chap. 6. writeth that the matter of *Scabies* is the blood; with the which Choler is mingled, and that converted into Melancholy or ſalt flegm: and with him the other Arabian Phyſitians agree. But the very truth is, that although in the *Scabies* the humor be not alwaies one and the ſame, yet in every *Scabies* there is ſome kind of mixture of the aduſt and melancholy, hot and dry humor. And furthermore, there is one ſort of *Scabies* that is moiſt, another that is dry. The moiſt, in the which there floweth forth a certain matter that is moiſt, and withal rotten, filthy, and purulent; but the dry is that in which there is but little or none of the aforeſaid matter caſt forth. And concerning this latter it is that *Galen* ſeems to ſpeak, as being ſuch wherein that melancholy humor doth more ſuperabound. But *Avicen* and the reſt of the Arabian Phyſitians underſtand hereby al kind of *Scabies* whatſoever. Now albeit the next cauſe of *Scabies* be a humor ſharp and ſalt; yet notwithſtanding *Avicen* doth not altogether abſurdly aſſert that blood is the matter of the *Scabies*. For ſeeing that *Scabies* is an Uniververſal Affect of the whol Body, it cannot therefore eaſily proceed from any other humor, unleſs that blood be likewiſe therewith mingled; and yet notwithſtanding the blood cannot properly be ſaid to be ſimply the cauſe of *Scabies*; to wit, ſo long as it retaineth its benign and temperate Nature. For whileſt it continueth benign and good, it can in no wiſe excite and cauſe the itching, neither yet thoſe Ulcerous Tumors or Swellings. Wherefore, before ſuch time as the blood can poſſibly produce and breed the ſaid *Scabies*, it muſt of neceſſity be corrupted, and other humors that are ſharp and biting therewith mingled. And true it is indeed, that yellow Choler is ſharp and corroding, but then it ſcarcely floweth in ſo great abundance, or is of that thickneſs as to excite ſuch like Tumors. But black Choler and ſalt Flegm are Humors very fit and moſt apt to produce the ſaid *Scabies*. For theſe Humors being thick, hot and dry, and withal biting and corroding, if they chance to be thruſt forth unto the Skin, there they ſtick faſt in it; and there they excite a hot and dry diſtemper, an itching, a ſwelling, and an exulceration.

But now as for the primitive Cauſes (and more eſpecially for the generating and breeding of thoſe ſalt, biting, and ſharp humors) the kind and ordinary courſe of Diet that is kept doth exceedingly advance and further the ſame, Meats (to wit) of a bad juyce, and that afford an unwholſom and corrupt aliment; ſuch as are ſalt, ſharp, and that are eaſily corrupted. And hence it is, that the poorer ſort of people (who live upon theſe kind of unwholſom corrupt meats) are moſt frequently infeſted with the *Scabies* or Scabbineſs; as likewiſe Children, and yong people in general, in regard that theſe are altogether careleſs and heedleſs in their Diet; whereupon they contract great ſtore of excrements, that being retained in the outward part of the body are there corrupted, and ſo they get an acrimonious quality. But then from theſe bad and naughty meats thoſe ſharp and ſalt humors are the more eaſily bred if there be preſent a hot and dry diſtemper of the Liver. And hitherunto likewiſe relateth the uncleanneſs and naſtineſs of the body, to wit, when there is altogether a neglect in the keeping it ſweet and clean; and if the foulneſs and impurities of the Skin be not duly waſhed off, or the garments not ſhifted and changed often enough; whereupon it is, that filth and impurities ſticking in the ſuperficies of the body do not permit ſo free a paſſage forth unto the excrements; and by this means the ſaid excrements acquire a certain acrimony, and ſo corrupt the other humors. The *Scabies* ariſeth likewiſe ſometimes after a Criſis, and after Diſeaſes both acute, and thoſe alſo that are of a long continuance; to wit, when Nature expelleth forth unto the Skin thoſe naughty and depraved humors, which it is not able any other way to diſcuſs and evacuate. And laſtly, *Congium* is likewiſe accounted and reckoned up among the principal cauſes of *Scabies*; which cauſe *Galen* alſo acknowledgeth, in his firſt Book of the Differences of Feavers, Chap. 2. and Book 4. of the Differences of Pulſes, Chap. 3. For in the Superficies of the Skin of thoſe that are Scabby there is a certain viſcous and clammy moiſture gathered together, which being either by the Apparel, or by ſome other means communicated to the body, corrupteth the humors therein, after the like manner, and produceth the like Affection, and that eſpecially in theſe bodies that are now already diſpoſed unto the *Scabies*. And indeed the humid or moiſt *Scabies* is the more contagious, in regard that in this there is generated more of the aforeſaid viſcid and clammy humidity.

The Differences.

Some there are that reckon up very many Differences of *Scabies*; as that one is new, another old and inveterate; and that one ſeizeth upon the whol Body, another upon the Hands only, and the Thighs: but the main and ſpecial Difference is that which is taken from the Difference of the Humors; that one ariſeth from a black and melancholy humor, (and this is called a dry *Scabies*) in which although there be a concurrence of other humors, yet notwithſtanding the greateſt part thereof is of this laſt mentioned humor; from whence it is, that out of the parts affected with this *Scabies*, either there is nothing at all ſent forth; or if there be any thing iſſuing out,

it is thick, dry; and the Ulcers themselves, as likewise the prints and footsteps (as we may so term them) of these Ulcers are wan and pale, and sometimes black: another is humid and moist; in which there aboundeth a salt flegm; out of which there plentifully floweth forth much moist filth and corruption, that is thin and subtile, sharp; and now and then likewise it wil be thick.

Signs Diagnostick.

The *Scabies* or Scabbiness, is an Affect very wel known, and it may easily be discerned, (as may also its Differences) and from those signs and tokens especially that we but even now mentioned. And yet notwithstanding those signs do now and then vary, and are something changed, according as the aduction of the other humors is greater or less.

Prognosticks.

1. Now although the *Scabies* be in this respect troublesom, to wit, in regard of the foulness and deformity that it causeth in the Skin, rather than that it bringeth with it, or threateneth any other danger nigh at hand; and that in youth it oftentimes preserveth, and likewise freeth from other Diseases: yet notwithstanding it is not alwaies secure and safe. For if it be of any long continuance, it may (and somtimes doth) turn into the *Lepra* or Leprosie; and in Ancient persons it is contumacious and stubborn, and hard to be cured.

2. And among the several species and kinds of them, the dry is more difficult in curing than the moist. And therefore (whatever kind or sort it be of) it is not at any hand to be neglected; but by a due and fit Cure (even for the very deformities sake, if there were no other cause) speedily to be taken away and removed.

Of the Scabies retiring inwardly.

That *Scabies* that hath its rise and original, not from any contagion, but from some internal default of the humors, for the most part breaketh forth (as it were) critically, and ariseth from some internal vice of some one or other of the Bowels; in which so soon as any vitious humors are generated, they are immediately by Nature thrust forth unto the outward part of the body: the which motion if Nature be not able to perfect and accomplish it; or in case she be by Medicaments administred unseasonably hindered in her operation, divers Diseases are from hence excited. Touching the Quartan we have spoken before, where we treated of Feavers. There are oftentimes other Feavers, (long continued, and sufficiently dangerous) and likewise very often intermingling Feavers; but for the most part, they are inordinate Feavers that arise in this manner, and by this means. Of this I here cured (in the yeer 1636. in the month of *April*) a certain man of a melancholy Constitution; and who had withal likewise a continued Feaver, together with a sore and very grievous Cough, by means of which he cast forth and brought away much Spittle, and somtimes also great store of blood; he was likewise afflicted with a difficulty and shortness of breathing, insomuch that there was now great cause to suspect and fear a *Phthisis* or Consumption. Now having for eight daies made use of Medicaments to very little purpose, I made a further and more strict enquiry into the Cause of the Disease; and then the Patient gave me to understand (which until now he had concealed from me) that before he was taken with this Disease he had the *Scabies* (or scabbiness, as we cal it) the which was no sooner vanished and gone, but this Feaver and Cough followed thereupon. The which I no sooner came to understand, but that I used the utmost of my endeavor, (by Medicaments made of Fumitory, and such like) to cause the Scabs again to break forth. Which I had no sooner effected, and administred such other Medicaments as I thought fit, but both the Feaver and the Cough ceased; and the man is yet living, and perfectly sound, without any the least fear of a Consumption.

Many Diseases proceeding therefrom.

An example of a continual Feaver from the Scabs retiring inwardly.

I have told you elsewhere of a certain Student; this man affected with this *Scabies* (after, and immediately upon the striking in of the Scabs) became instantly blind, and for two daies could see nothing at al; this his blindness was likewise accompanied with an extraordinary streightness of the Breast, difficulty of breathing, and black Urines. This man upon the use of fit and conveniene Medicaments that were administred to evacuate the adust humor (as Fumitory, and such like) within four daies recovered his sight again. The same party (a quarter of a yeer after) being again afflicted with the same Malady did not lose his sight as formerly, but had one fit of the Falling-sickness. But yet notwithstanding, having had fit and proper Medicaments prescribed him, he again recovered.

Another example of blindness from the same cause.

And likewise of the Epilepsie.

I have likewise seen many that from Scabbiness have been surprized and invaded with prickings and shootings in the Breast, with the bastard Pleurisie, and dangerous stitches, and likewise with the *Cachexy*. I knew also a youth (aged fourteen yeers) that upon the unseasonable use of inunctions (against the *Scabies*) made his Urines black, lost his sight; and at length being seized upon by the Epilepsie (and the fits thereof being become very frequent) in the end he died thereof. Wherefore we say that this *Scabies* is no way to be sleighted,

And many other discommodities and inconveniences arising from the same cause.

ſleighted, neither driven inwardly, or up and down; and if it ariſe from any internal vice of the humors, and the Cacochymy, then externall Medicaments are by no means to be adminiſtred before the uſe of Purgers, and other internal neceſſary Medicaments.

The ſame is likewiſe to be taken and underſtood touching the Achores in Infants:

But now what hath been ſaid touching the *Scabies* or Scabbineſs; the ſame is likewiſe to be aſſerted touching the *Achores* or running ſores in the Head, yielding a thin excrement in Infants. Concerning theſe *Hippocrates* (in his Book of the Epilepſie or Falling ſickneſs, which he calleth *Morbus Sacer*) writeth thus; *Thoſe Infants* (ſaith he) *that have Ulcers breaking forth upon their Heads, and upon their Ears, and upon the reſt of their Body; and ſuch as ſpit often, and abound with Snot, theſe are they that in the progreſs of their age live moſt at eaſe. For hither floweth (and from hence is likewiſe purged forth) that Flegm which ought to have been purged in the Mothers Womb; and theſe Infants that are thus purged are never ſeized upon by the Falling ſickneſs.* Whereas on the contrary, if either the Phyſitians, or the Women-Doctors (as they call them) do without due caution and unſeaſonably adminiſter aſtringent and Repelling Medicaments, and therby heal up the ſaid *Achores*, the Infants muſt then unavoidably fal into Feavers, the Epilepſie, Convulſions (the vitious humor retiring and running unto the internal parts) and ſometimes likewiſe they (within a very ſhort ſpace) even die hereupon.

The Cure.

Now therefore in the firſt place, there is a due care and regard to be had in point of Diet; and there muſt be a totall abſtinence from thoſe Meats that generate aduſt and ſalt humors; *Viz.* all things that are ſalt, ſharp, bitter, Oyls themſelves, and whatſoever partaketh of an oyly Nature: and on the contrary, Meats of a good and wholſom Juyce are conſtantly to be fed upon. And this may alſo be obſerved, and taken for a general rule, that it is more convenient that the food that is given unto Perſons that are thus affected (to wit, with Scabbineſs) be rather boyled than either roſt or fried. For what is either roaſted or fried, doth eſpecially generate a more ſharp and dry humor. After this, the acrimony & ſharpneſs of the humors is to be qualified and tempered; and the diſtemper of the Liver is eſpecially to be reduced unto its priſtine Natural ſtate; and the ſalt and ſharp humors are likewiſe to be evacuated. And therefore (in the very beginning) the firſt waies and paſſages (as we term them) are to be purged and emptied; as for example;

Take *Electuar. Diatholic. half an ounce, Powder of prepared Sene half a dram; and ſo with Sugar make a Bole.*

If there be preſent any extraordinary ſtore of Blood, that the humors are overhot, it wil then be very requiſite and proper to open a Vein in the Arm. For Nature is wont to expel the vitious humors out of thoſe greater internal Veins unto the external branches, and thoſe that lie under the Skin; which from thence (a Vein being opened) are together with the Blood evacuated.

Afterwards (in a moiſt *Scabies* from ſalt Flegm) Preparatives are to be adminiſtred, of Cichory, Agrimony, the Hop, and Maiden-hair; and Purgers of Agarick, Rheubarb, and Sene Leaves. In a dry *Scabies*, Preparers of Fumitory, Borrage, Bugloſs, Violets; and Purgers, of *Epithymum* (we commonly call it Mother of Tyme) Polypody, Sene, black Hellebor: from whence (for this preſent purpoſe) various forms and Receipts may be made and compounded. As,

Take *the Roots of Cichory one ounce, Polypody, ſowr Sorrel, the inward rind of the black Alder Tree, of each half an ounce; of Saſſafras wood, raſped Liquoriſh, of each two drams; Fumitory, Sorrel, Agrimony, Scabious, of each one handful; Epithymum, the Flowers of Borrage and Bugloſs, of each half a handful, Raiſins one ounce and half; boyl them in a ſufficient quantity of common water, or elſe Whey; and for two pound of the ſtreining clariſied, add of the Syrup of Endive and Cichory with Rheubarb, of each half an ounce; of Elder Vinegar, two ounces. Mingle them wel together, and let the Patient take hereof four or five ounces.* Or,

Take *Cichory roots ſix drams; Licboriſh three drams, Fumitory two handfuls, Endive one handful, Flowers of Borrage, Violets, Bugloſs, of each half a handful; the ſeed of Melons, and Endive, of each one dram; the Leaves of Sene one ounce, the Rinds of Mirobolans Citrin. and Ind. of each half an ounce; Polypody of the Oak five drams, the whiteſt Agarick four drams, choice Rheubarb two drams, Spike one ſcruple, Cinnamom, and Ginger, of each half a dram; let them boyl in a ſufficient quantity of Scabious and Fumitory water for two lib.; let them ſtand for one night, and afterward ſtrain and clarifie them; and let them be aromatized and ſpiced with Lign. Aloes, and red Saunders, of each one ſcruple. The Doſe is four or five ounces.* Or,

Take *the Decoction of Sene nine ounces, Syrup of Fumitory, Epithymum, and of Cichory with Rheubarb, of each two ounces; Mingle and aromatize them with Cinnamom, and Spec. Diarrhod. Abbat. half a dram; give hereof at once four or five ounces.* Or,

Take *Fumitory one handful, the four Cordial Flowers of each one pugil, Epithymum half a dram, raſped Liquoriſh two drams, the Leaves of elect and choice Sene three drams, black Hel-*

lebore one scruple, Polypody of the Oak three drams, Raisins stoned two drams, Anise seed one scruple; boyl for four ounces. In the streining infuse of the most choice Rheubarb one scruple, Cinnamom half a scruple, Spike and Schænanth, of each three ounces; unto the streining pressed forth add of the Syrup of Fumitory, and Bizantin. simp. of each three drams; Make herewith a Potion to drink; and let it be taken down as often as need requireth.

If it be requisite, and that the Body stand in need of any further purging, then let the stronger sort of Purgers be administred. As,

Take *Confection of Hamech three drams, Elect. Roses of* Melues *one dram and half, and so make a Bole. Or, dissolve these Electuaries in the simple water, or the Decoction of Fumitory, three ounces thereof; and then add Syrup of Epithymum and Fumitory one ounce, and mingle them: After other preparations and purgations, we may then safely use the infusion of black Hellebore, in this manner prepared.*

Take *the roots of Cichory, and Polypody of the Oak, of each one dram and half; Fumitory half a handful, Flowers of Borrage, Bugloss, and Cichory, of each one pugil; Epithymum and Raisins, of each two drams; boyl them for five ounces: in the streining infuse for the space of one whol night, of the true black Hellebore a dram and half; Cinnamom one scruple, Carrot and Anise seed, of each half a scruple; Cloves five grains; unto the streining pressed forth add Syrup of Fumitory, and of Cichory with Rheubarb of each three drams; Let them be aromatized with one scruple of the Species of Diarrhodon Abbatis.*

But more especially there is here to be administred (as that that is of singular benefit) the Whey of Milk, and chiefly that of Goats Milk; which indeed (in the moist *Scabies*) may first of all be administred, with one ounce of *Succus Rosarum* or the Juyce of Roses, that it may withall purge; and after for four or five daies may only alter. If the *Scabies* be dry, then there may be added two or three ounces of the Juyce of Fumitory, or also two ounces of the Emulsion of the seed of Melons; and thus it is a most efficacious Medicament both against the *Scabies* and the Itch.

Or else the Whey may likewise be prepared after this manner.

Take the Whey of Goats Milk one quart, Mirobalans bruised two ounces, Epithymum one dram and half; infuse them for a night, and in the morning give the Patient one ounce of the streining. Or,

Take the Roots of Cichory, Fumitory, Sorrel, the Sprouts or tendrels of Hops, Agrimony new gathered, of each one handful; Wormword and Rosemary of each one pugil; boyl all these in a sufficient quantity of Goats Milk while it is yet warm, until a fourth part thereof be consumed. Afterward let there be dropt thereinto two or three spoonfuls of Elder Vinegar; and when the Milk is Curdled, the thin and cleer Whey may be taken in the morning, either alone, or (which is better) with the Syrup of Cichory with Rheubarb.

When the Body is sufficiently purged, then it wil not be amiss to administer those things that provoke Sweat. As,

Take Treacle, and Mithridate, of each one scruple, the thickned Juyce of Fumitory half a scruple, Syrup of the Juyce of Sorrel, two drams; dissolve them in Fumitory Water, and so let them be taken in the morning; and the Patient being wel covered in his Bed, let him Sweat for some hours. For this use and purpose, Fumitory alone may be administred, and so may Pimpernel, Columbines, and Elder. But if the *Scabies* be stiff and stubborn, and wil not yield unto the Remedies aforesaid, we may then also use the Decoction of Sarsaparilla; unto which notwithstanding it will not be amiss to add, and therewith to mingle the Water or Syrup of Fumitory.

When these things have been made use of, we are in the next place to betake our selves to Topicks. And here we commend unto you (in the first place) the use of Baths, as wel sweet Baths, as Mineral and hot Baths, among which those that proceed from Sulphur are chiefly commended: the continual use whereof, notwithstanding since that it doth extreamly dry, for this reason it is somtimes requisite and convenient in a dry *Scabies*, by turns to make use of the sweet and Sulphury Baths, so that the Patient make use of the sweet Baths twice, and four times of the other, to wit, the Sulphury. For by the only use of such Baths, and Whey alone, even the most contumacious *Scabies* is oftentimes cured. But seeing that those mineral Baths are not every where to be found, we may therefore substitute and appoint others in stead of them, that have a faculty and power to digest and cleanse, and to open, throughly cleanse, and purge the Pores of the Skin; which if they be mingled together with those things that cool, and mitigate the pain and itching, you have then a most excellent and soveraign Remedy. As,

Take Alum one ounce and half, Sulphur two ounces, Nitre one ounce, Salt a handful; Make hereof a Powder which may be cast into a Kettle full of warm water. Or,

Take Common Salt half a pound, Alum three ounces, Vitriol four ounces, Tartar and Nitre, of each two ounces; let them be throughly bruised, and then cast into the Bath.

In the Bath there may likewise be boyled, Mallows, Fumitory, Scabious, Mugwort, Beets, the Root of four Sorrel; and a Bag hung therein, filled with Bean meal and Bran. There may likewise this following Bath (or such like) be provided. *Viz.* Take

Take Roots and Leaves of the ſowr Sorrel three handfuls: Elecampane Root three ounces: Briony half a pound: Mallows, Scabious, Fumitory, Selandine, Sopewort (which ſome cal Bruiſewort) of each two handfuls: whol Barley, Lupines, Beans, of each half a pound: Bran one pound: Camomile flowers three handfuls: boyl them for a Bath.

For this ſame uſe and purpoſe, Liniments likewiſe and Unguents are prepared; a great number whereof we meet with every where in Authors. They are compounded and made (as I have told you) of ſuch Medicaments as cleanſe and purge the Skin; ſuch as are Nitre, Flowerdeluce, bitter Almonds, Southernwood, Hellebore, the Root of Briony, of white Lillies, Bean meal, the meal of the bitter Verch Orobus, the meal of Lupines, Turpentine, Sulphur, Tartar: Unto theſe you may add and mingle therewith Anodynes, that is to ſay, thoſe Remedies that mitigate the itching, and aſſwage the pain that is excited by other Medicaments; and ſuch are theſe, viz. Oyl of Roſes, Oyl of Dill, and Oyl of Camomile, the Fat of a Hen, Gooſe Fat, the Fat of a Calf, new and freſh Butter, Hogs Lard, &c. Adding likewiſe thoſe things that correct and amend the diſtemper of the Skin; and ſuch are theſe, to wit, the juyce of Sorrel, Milk, the ſeed of Melons: thoſe Medicaments are likewiſe herewith to be mingled that are of thin parts; as Vinegar, and the juyce of Lemmons.

From al which, and other ſuch like (as we ſee occaſion) divers Medicaments are compounded; according to the nature, condition, and conſtitution (together with al other circumſtances) of the body thus affected. For al kinds of *Scabies* or Scabbineſs are not eaſily to be cured with one only Medicament: and whoſoever they be that attempt this, they are juſtly to be accuſed either of negligence or ignorance. For the milder ſort of Medicaments are moſt fit and proper in a mild and moderate *Scabies*, in Children, Women, tender and delicate perſons; and ſo on the contrary: And likewiſe the moiſt *Scabies* requireth one kind of Medicaments, the dry another.

The milder and gentler ſort of Remedies are theſe that follow: Viz.

Take Litharge firſt diſſolved and diluted with Roſe Vinegar, the Roots of white Lillies, of each two drams: Oyl of Roſes two ounces: Bean meal one ounce: Juyce of Lemmons two drams: Camphire four grains: thoſe of them that are to be pulverized, let them be beaten into a very ſmal and fine pouder, and ſo mingled with the reſt into the form of a Liniment. Or,

Take Juyce of ſowr Sorrel, and Elecampane, of each one ounce: Juyce of Lemmons ſix drams; Turpentine an ounce, Litharge half an ounce, Ceruſs two drams, common Salt half a dram, Oyl of Roſes as much as wil ſuffice; and make a Liniment. Or,

Take the Fat of a Hog an ounce and half: Oyl of Roſes one ounce. Turpentine half an ounce: Oyl of Tartar, and the Yelks of Eggs, of each one dram: Pouder of Frankincenſe two drams: common Salt one ſcruple: and mingle them carefully. Or,

Take freſh Butter, and Turpentine, of each four ounces: Oyl of Roſes, and Myrtles, of each one ounce: two Yelks of Eggs: Ceruſs one ounce: Salt two drams: Mingle them wel. Or,

Take the juyce of ſowr Sorrel, and Elecampane, of each an ounce and half: Vinegar half an ounce: Oyl of Roſes and Wax, of each a ſufficient quantity: and make an Unguent. Or,

Take Turpentine waſhed with Roſe water half an ounce: the juyce of ſowr Oranges three drams: the Yelk of one Egg, Butter two drams, Oyl of Roſes as much as wil ſuffice to make a Liniment. Or,

Take Turpentine waſhed in Scabious water one ounce: Oyl of Roſes half an ounce: freſh Butter and Hogs Greaſe, of each two drams: Salt half a dram: Litharge one dram: the Yelks of two Eggs: Juyce of Lemmons ſix drams: Wax as much as wil ſerve the turn to make an Unguent. Or,

Take Juyce of ſowr Sorrel one ounce: Turpentine, and Styrax liquid, of each a dram and half: Elecampane Root two drams: Frankincenſe one dram: the Yelk of one Egg: Salt one dram: Vinegar a dram and half: Hogs Greaſe and Oyl of Roſes, of each half an ounce: Wax a ſufficient quantity to make a ſoft Unguent. Or,

Take Litharge half an ounce: Ceruſs two drams: Maſtick, and Frankincenſe, of each two drams: the juyce preſſed forth of an Orange (the Orange being cut in pieces together with its rind) one ounce: Oyl of Roſes as much as wil ſuffice. Stir them wel about al together in a Leaden Mortar, and ſo make an Unguent.

For the Rich, and ſuch as are tender and delicate, there are wont to be made Unguents of Apples; which they therefore cal *Pomata's* or *Pomada's*; as for inſtance, thus:

Take Cinnamom and Cloves, of each three drams: Lavender flowers two ſcruples, Nutmeg two drams, Styrax Calamite one dram, Benzoin five drams, Camphire one ſcruple, ſweet ſmelling Apples one pound and half, Roſe water the like quantity, Wine four ounces, the fat of a Hog freſh and ſweet one pound: boyl al, and ſtrain them, and then add of Musk half a ſcruple: and make a Liniment.

But in ſuch as are of ful age (eſpecially where the *Scabies* is confirmed and ſetled) the ſtronger ſort of Medicaments are neceſſary. As for Example:

Take the Juyce of ſowr Sorrel one ounce; Sulphur Citrine three drams; Nitre two drams; Liquid Styrax, and Lupine Meal, of each two drams and half; Oyl of Roſes as much as will ſuffice;

ſuffice; a little Wax; and ſo make an Unguent. Or,

Take Sulphur half an ounce; Nitre one dram; Oyl of Roſes, and Oyl of Nuts, of each one ounce; Juyce of Lemmons two drams: mingle them, &c. Or,

Take the Roots of Elecampane, ſowr Sorrel, of each one ounce; boyl them in Vinegar, and let them be paſſed through a fine ſieve. Then add of live Sulphur one dram; common Salt half a dram; of the Juyce of Lemmons ſix drams; of the white Unguent of *Rhaſis*, and of the Citrine Unguent, of each half an ounce; Oyl of Tartar, and Oyl of Roſes, of each as much as wil ſuffice; a little Wax: Make an Unguent. Or,

Take good Wine that is ſweet ſcented, a pint and half; Sulphur three drams; Frankincenſe two drams; Salt one dram and half; Hogs greaſe three ounces; Wax one ounce and half; let them boyl together to the conſumption of the third part; and in the end add of liquid Styrax a dram and half; Mingle them. Or,

Take Root of Pimpernel, ſowr Sorrel, Elecampane, of each half an ounce; let them be infuſed in the Water of Fumitory, and afterward let them be boyled; unto the ſtraining ſtrongly preſſed forth add Turpentine three ounces; Oyl of Roſes two ounces; let them boyl until a third part or the one half be conſumed; and then add of Sulphur half an ounce; Allum two drams; Salgem, and Nitre, of each half a dram; Oyl of Eggs and Wax, of each a ſufficient quantity; and make an Unguent. Or,

Take unſalted Butter four ounces; Turpentine an ounce and half; Sulphur two drams; Salt half a dram; the Yelk of one Egg; and mingle them wel together. Or,

Take Turpentine four ounces, Citrine Sulphur half an ounce; the Root of Pimpernel, Elecampane, *Lapis Calaminaris*, of each half a dram; Salgem three drams; Litharge, and Ceruſs, of each one dram; the Yelks of two Eggs; Allum two drams; a little Vinegar, and Oyl of Roſes as much as wil ſuffice, and make an Unguent.

There are ſome likewiſe that mingle Quick-ſilver and Sublimate with thoſe Unguents and Liniments they make uſe of in this Affect. But in regard that there oftentimes thereby accreweth unto the Patient much dammage and danger; it is therefore the more ſafe and adviſed courſe (in the ſaid *Scabies*) altogether (or as much as poſſibly may be) to abſtain from Quick-ſilver and Sublimate, inaſmuch as the ſaid *Scabies* may be cured by other Medicaments.

And ſometimes likewiſe (for the anointing of the Hands) there are provided little round Balls, Sopes, and thoſe Waſhballs they commonly cal *Smegmata*; as for example:

Take Pouder of the Flowerdeluce Root half an ounce; of Elecampane two drams; Feculæ Brion. and Gerſæ Serpentariæ (by both which you are to underſtand a Pouder made by Art of the freſh Roots of Briony, and Wake-Robin or Cuckowpint, the pouder of which laſt is called Gerſa Serpentaria, and it is as white as Starch or Ceruſs) of each one dram; Choice Frankincenſe two drams; Oyl of Tartar three drams; Liquid Styrax two drams; the meal of Lupines half a dram; the Juyce of ſowr Sorrel three ounces; Venice Sope diſſolved in Roſe water and Fumitory water, as much as wil ſuffice; Musk if you pleaſe half a ſcruple, or ſomwhat more; mingle al theſe, and make a Maſs, and of it little Balls that may be wrapped about with Silk. Or,

Take the diſtilled Water of ſowr Sorrel one pint; the Juyce of Plantane two ounces; Roſe water one ounce and half; Juyce of Lemmons one ounce; Litharge three ounces; Ceruſs two drams; Mercury ſublimate ſix drams; common Salt two drams; Sulphur one dram and half; Pouder what is to be poudered, and then mingle them in the Waters; let them ſtand infuſing twenty four hours, and afterwards deſtill them.

Another experimented Remedy, in al kinds of *Scabies* or Scabbineſs.

Take Roots of ſowr Sorrel (while they are yet green) and of Elecampane, green likewiſe, of each half a pound, Swines fat three ounces; bruiſe the Roots wel in a Mortar, and let them boyl a little over a gentle fire; and after let them be hard preſſed and ſqueezed, and ſo make hereof an Unguent.

Of Malum Mortuum.

Some Phyſitians make mention of a peculiar kind of *Scabies*, which they cal *Malum Mortuum*, becauſe therein the body appeareth black, and as it were mortified; which is a *Scabies* with a wanneſs and blackneſs, and cruſty Puſtules that are black, foul, without any matter, ſenſe, and pain, eſpecially in the Hips and Ankles, taking its Original from Natural Melancholy when it is become aduſt; and thereupon it is that it followeth the uſe of Melancholy Meats, the obſtruction of the Spleen, and the retention of the Hemorrhoids; and without doubt, it wanteth not the ſcorbutical malignity. And it is a Malady (as are likewiſe al Melancholy Affects) of a long continuance, and very hard to be cured.

But yet it is to be cured by preparing the Melancholy Humor, and purging of it in a fit and convenient manner, and by correcting the fault of the Spleen (upon which it dependeth) touching which (as in the Scurvy, ſo likewiſe elſewhere here and there) we have already often ſpoken. The body being evacuated, we are to continue thoſe Medicaments that temper the Melancholy humor; unto which there are to be added thoſe Medicaments that are good and proper againſt the Scurvy.

Further-

Furthermore, let the body be washed with this Bath, prepared and made of the Roots of Polypody, sowr Sorrel, Elecampane, Flowerdeluce, the rinds of the Elder, Danewort, Wormwood, Fumitory, Parietary, and Mallows. When the Patient goeth into the Bath, let there be given him the Conserve of Fumitory, or the Syrup or Water thereof with Treacle.

Afterward let the place affected be anointed with *Unguent Diapompholygos*, or such like.

Take *Juyce of Fumitory, of sowr Sorrel, Selandine, Spoonwort, and Water-Cresses, of each an ounce; the fat of an old Hog three ounces; boyl them until the Juyces be consumed; and then add of live Sulphur half an ounce; Oyl of Nuts an ounce; Unguent Diapompholygos one ounce and half; Frankincense two drams; Turpentine half an ounce; mingle them wel together in a Leaden Mortar, and make an Unguent.*

Chap. 28. *Of* Lepra *of the Greeks.*

LEpra (so called from the Greek word *Lepis*, in Latine *Squamma*, in regard of the resemblance it hath with the scales of fishes) is a certain high, or indeed the highest degree of *Psora* or *Scabies*. But now (at the very first, and before we proceed any further) lest that any one should be troubled, and made to doubt in the reading of Authors, it is to be observed that we here speak of the *Lepra* of the Grecians, and not that of the Arabians. For that Affect which the Arabians cal *Lepra*, is the same with the Greeks Elephantiasis, touching which we shal speak in the next Chapter, which is nothing else than an universal Cancer of the whol body; as it is manifest from the description that is given it by *Avicen* in his *Tertia Quarti*, Tetrab. 3. Chap. 1.) where he saith thus: The *Lepra* is a Disease having its original from black Choler dispersed throughout the whol body; and from whence the temperament of the parts, the form and figure, and at length also the very continuity it self is corrupted; and it is a Cancer common to the whol Body.

But now again the Arabians cal the *Lepra* with the Greeks, *Albaram nigram*, or the black *Albaras*; as appeareth out of the same *Avicen*, in his *Septima Quarti*, Tetrab. 2. Chap. 9. *The black* Albaras (saith he) *is that very same affect that we otherwise also call* Impetigo Excoriativa; *and it is a scabbineß happening unto the Skin, rough, vehement; and it maketh scales like unto fish scales, with an itching, and it is accompanied with a melancholy humor, and it is one of those things that precede and go before the* Lepra: By al which words *Lepra* of the Greeks is manifestly described. For why? *Lepra* of the Greeks is a *Scabies* in the highest degree, and differeth from the *Scabies* only in the vehemency of the Affect. From whence also it is that *Paulus Ægineta* in one and the same Chapter, viz. Chap. 2. of his fourth Book, handleth both the *Lepra* and the *Scabies*: But *Avicen* (whom I had rather follow) treateth of them in several and peculiar Chapters; to wit, of *Scabies*, in the seventh Section of his fourth Book, Tetrab. 3. Chap. 6. But he handleth *Lepra* of the Greeks in the place alleadged.

Albaras nigra, *or the black* Albaras.

For in *Lepra* there is a far greater corruption of the Humors, and consequently a greater distemper than there is in *Scabies*: and in *Scabies* there fal off only certain bran-like substances; whereas in the *Lepra* that that fals off resembleth the scales of Fishes; so that from the itching, by the *Scabies*, there is an easie and ready passage unto the *Lepra*. For this itching is a certain kind of light roughnes in the Skin, in the which (unless haply it be the more violently scratched) there falleth off nothing at al from the Skin. In the *Scabies*, afterward the Humor becometh more evident; and upon the scratching there fal off certain branny bodies. In the *Lepra* the swelling is greater; and there fal off no longer certain smal branny substances, but scaly bodies, whether there be any scratching or not. For in the *Scabies* the matter is more thin, and preyeth upon the highest and utmost Skin alone: but in *Lepra* the matter is more thick, and therefore doth not only feed upon the utmost superficies, but likewise upon the deeper parts of the Skin.

Celsus *his Impetigo.*

And without al doubt, *Celsus* in his fifth Book, and 26. Chap. under the name of *Impetigo* propoundeth and comprehendeth this *Lepra* of the Greeks; and in no wise doth he understand the Greeks *Lichen* (which by others is called *Impetigo*) when he thus writeth: *But now* (saith he) *there are of* Impetigo *four species or kinds; of the which that is least hurtful that in likeneß representeth the* Scabies. *For it looketh red, and is harder, and is also exulcerated, and corrodeth. But it is distinguished from the said* Scabies, *because that it is more exulcerated, and hath Pustules like unto* Vari; *and there seem to be in it (as it were) little bubbles or wheals, out of which in proceß of time smal scales are resolved; and this returneth at some more certain times. A second kind there is worse than the former, almost like unto a* Papula, i. e. *Blister or Wheal, but rougher and redder than it, and having divers forms. There fal off from the utmost Skin smal scales, the corrosion is greater, its progress is swifter and broader; and at more certain and set times it likewise both beginneth and endeth; it is sir-named* Rubrica. *The third sort is yet worse; for it is thicker, and harder, and swelleth more; it is also cleft in the top of the Skin, and it corrodeth more vehemently. It is also in its motion forward scaly, but black; and it creepeth afar*

off

off both slowly and broadly. At certain times it either ariseth or endeth; neither can it be totally taken away, it is firnamed the Black. *The fourth and last sort is that which altogether refuseth to admit of any Cure, and differing in colour: for it is somwhat whitish, and like unto a new made Cicatrice or Scar, and it hath little pale Scales, and some of them are whitish, and some of them like unto a Pimple, which being taken away now and then Blood floweth forth. But otherwise its humor is somwhat white, the Skin is hard and cleft, and it proceedeth broadwaies. Now all these kinds do chiefly arise in the Feet, and Hands, and they also infest the Nails. There is not any one Medicament whatsoever more effectual then what (out of my Author* Protarchus *) I have already related, as appertaining to the* Scabies. *But Serapion hath prescribed of Nitre two pugils, and Sulphur four pugils, to be mingled together, and made up into a Mass with good store of Rosin; and this Remedy he himself likewise made use of.* Thus *Celsus.*

Neither is there any Author either Greek or Latine that hath made or mentioned so many kinds of *Lichenes*: which yet are easily found in the *Lepra* of the Greeks; neither do we meet with any one Chapter in *Celsus*, wherein he treateth of *Lepra*; which notwithstanding although it were unto him unknown, could not possibly be so unto the most studious and knowing *Hippocrates*. Moreover, the *Impetigo* is by *Celsus* said to be worse then even the least and lightest *Scabies*; and furthermore *Celsus* writeth that all the kinds of *Impetigo* do send forth Scales; which indeed is most proper unto *Lepra* of the Greeks; and it is thought likewise to have received its name from *Lepis*, that is, a Scale; whereas on the contrary, never any hitherto hath attributed any scales whatsoever unto *Lichen* of the Greeks. We now proceed to the Causes.

The Causes.

The Cause of this Malady is black Choler. For although there be also some certain of the Ancients that have asserted that *Lepra* likewise ariseth from salt Flegm: yet notwithstandinding this is not so to be understood as if *Lepra* did arise and might be excited from salt Flegm alone, but that salt Flegm is somtimes mingled together with black Choler. And therefore we say, that whatsoever generateth and heapeth up black Choler, the same causeth, or at least very much advanceth the breeding and production of *Lepra*. All which have been already made known out of our former discourse touching the *Scabies*; as for instance, an unfitting Diet, a dry temperament, the Hemorrhoids or monthly Courses suppressed, Issues stopt that had been long kept open and running and a Quartane Feaver. And lastly, Contagion likewise maketh very much to the generating of the *Lepra*, in like manner as it doth in *Scabies*. For albeit there be some that deny that the *Lepra* is contagious; yet notwithstanding they seem thus to do without any evident Cause. For if *Scabies* be contagious, then without doubt *Lepra* is so likewise, it being the worst *Scabies*; and the truth is, it is most agreeable to Reason, that the excess of the *Scabies* should be more contagious then the *Scabies* it self.

Signs Diagnostick.

Lepra is easily known, since that it hath the very same signs with the *Scabies*. This one thing alone is proper and peculiar unto *Lepra*, *viz.* that is sendeth forth Scales. The Sweat is stinking, and the Malady will hardly yield and give way to Remedies. The Skin (as in the *Scabies*) is rough, dry and withered, there is present an itching, and there are certain substances resembling the Scales of Fishes that fall off from them that are affected with it, whether they scratch or forbear scratching.

The Prognostick.

Now this Malady is difficult, very stubborn and contumacious. And unless it be maturely taken in hand, and dealt withall, it wil degenerate into the Leprosie or *Elephantiasis*; to wit, if black Choler be so heaped up together in the Body, that it now seizeth upon not only the exterior parts, but the internal also.

The Cure.

As for the Cure hereof: Seeing that *Lepra* is a *Scabies* in the highest degree, it therefore requireth likewise the same Medicaments that the *Scabies* doth; only they must be made somwhat stronger. Wherefore a good and fitting Diet being ordained, the Body is to be evacuated (as hath been said) the distemper of the Liver to be corrected, and the matter that hath invaded the Skin is by Digestives and cleansing Medicaments to be taken quite away. And in the first place, it will not be amiss here to provoke Sweating with the Decoction of Sarsaparilla, or *Guajacum* Wood. To cleanse, *Galen* (in his sixth Book of the making of simple Medicaments) doth especially commend a Myrepsick Suppository; which in regard that it hath a very strong astringent power, if Vinegar be therewith joyned, having laid aside, and put off its astringent power and virtue, will excellently well discharge the office of Cleansing, and deeply penetrating in all affects of the Skin. Sulphur is here likewise very commodious, by reason of its abstersive Virtue. The rest of the Remedies are specified in the precedent discourse of *Scabies*. And more likewise (which may very fitly be here made use of) shall be said below, in Chap. 4. where we treat of the *Elephantiasis*.

Chap.

Chap. 29. *Of* Vitiligo, *or* Leuce, *and* Alphus.

WHereas in the former Chapter we told you that the *Lepra* of the Greeks is by the *Arabians* called the black *Albaras* (for the *Arabians* mention two kinds of *Albaras*, the one white, the other black) and that the white *Albaras* of the *Arabians* is the same with *Leuce* of the Greeks; and seeing that *Leuce* is a Species of *Vitiligo*; we therefore judg it fit to subjoyn *Vitiligo* unto *Lepra* of the Greeks.

Vitiligo.

The truth is, there be some that strenuously dispute, whether or no *Leuce* and *Alphus*, and the like Evils that we shal anon propound, do belong unto Diseases, or else unto Symptoms; and they scrape together (out of *Galen*) divers places, in which he seems to assert, now this, now that, now one thing, and then another. But since our purpose in this Book is to treat both of the Diseases and likewise of the Symptoms of the extream parts; we wil not therefore scrupulously dispute hereof. Let it suffice that we give you notice of this, that if the recess from the Natural state (whether it be in the distemper, or in the Organical Constitution) be so smal that it hurteth no action, it is then no Disease, but only a symptom; and hitherunto are to be referred the changed colours of the Skin. For although in our former Books we propounded the Diseases and Symptoms of the parts severally and assunder; yet notwithstanding it could not here fitly be done, in regard that somtimes the same Affect (according to the greatness of the recess from the Natural state) is one while a Disease, and another while a Symptom only.

Now unto the word *Vitiligo* (from whence soever it be derived) there is no general Greek word to be found that answereth unto it; but it conteineth under it these three Affects, *Leuce*, and both the *Alphus*, to wit, the white and black. For so *Celsus* writeth, in his fifth Book, Chap. 26. about the end thereof. *There are* (saith he) *three* Species *of* Vitiligo; Alphus *where the white colour is somwhat rough, and not continued; so that there seem to be as it were certain smal drops dispersed. And somtimes it creepeth broader, and with certain intermissions.* Melas *differeth from this colour, in regard that it is black, and like unto a shadow, other things are the same.* Leuce *hath somwhat like unto* Alphus, *but it is more white, and it descendeth deeper, and in it there are white hairs, soft and tender as wool or down feathers. All these creep, but in some faster, in others more slowly.* But *Galen* (as we have already said) hath no common name under which to comprehend *Leuce*, and *Alphus*, but he propoundeth them as divers Affects; in his second Book of the Causes of Symptoms and the second Chapter.

Among the *Arabians* we meet with the word *Albaras*, which they divide into white and black not as one and the same Disease into its Species, but as a word into its significations. For different Affects they are, and *Albaras nigra* or the black *Albaras* is nothing else than *Lepra* of the Greeks, and the *Impetigo* of *Celsus*. But *Alba* or the white, the Greeks term *Leuce*; which appellation *Celsus* doth both keep, and maketh it a Species of *Vitiligo*. Like as *Pliny* also maketh mention of the white *Vitiligo*, in his Book 18. and Chap. 15. and in his Book 31. Chap. 10. But of *Nigra* or the black, in his Book 22. and Chap. 25. For there is no word or name to be found among the Latines that may answer unto the Species of *Vitiligo*, to wit, *Leuce* and *Alphus*.

To wit, Physitians do thus stile *Leuce*, (as *Galen* writeth in his third Book of the Causes of Symptoms, and Chap. 2.) from the Colour imposing the name thereon. For look what kind of flesh Locusts have, and so likewise almost al kind of Oysters, the like hereunto have they also that have their Skins fouled and defiled with *Leuce*. But *Alphoi* are so called from the Greek word signifying to *change*, to wit, because the colour of the Skin is changed; and yet notwithstanding not of the whole Skin, but up and down here and there great spots arise throughout the Skin; and for the most part in the Body also. And the truth is, their generation (as *Galen* there tels us) is of the like kind, to wit, from a vitious nutriment. Yet notwithstanding under these the whol flesh is not vitiated; but only in the very superficies and top of the Skin there are as it were certain little scales fastened thereupon: and the truth is, that *Alphi* or the white arise from a flegmatick, but the black from a melancholly Juyce. And yet they are not true and right scales, but there is a certain kind of roughness perceived in the Skin, together with the change of colour. For in this the black *Alphus* differeth from the *Lepra* or the black *Albaras* of the *Arabians*, that in *Albaras Nigra* or the black *Albaras* there are both excoriation and scales, whereas in the black *Alphus* there are neither.

Morphæa.

Alphus is likewise called *Morphæa*, without all doubt from *Morphe*, to wit, because the colour of the Skin is changed into white and black. *Celsus* hath used the Appellations of the Greeks, in distinguishing the several species of *Vitiligo*; and he hath named the first Species *Leuce*, or *Leuca*: but *Alphus* he calleth only by the single name *Alphus*; and the black he stileth *Melas*.

But now this change of colour (as wel in *Leuca* as in *Alphus*) doth not only consist in the Skin, but is extended likewise unto the Hairs; and as *Celsus* in the place alleadged writeth, in *Leuca* there are white Hairs, such as are like unto the

soft and tender Hair in new born Children; and the white *Alphi* likewise (as *Paulus Ægineta* tels us in his fourth Book, and Chap. 6.) produce white Hairs, and the black *Alphi* black Hairs. And *Johannes Philippus Ingrassias* (in his first Tract of Tumors, Chap. 1. P. 142.) assureth us, that he had more then once seen even old Gray-headed Men that have had some part either of their Beards, or of their Eye-brows black, like as it is in young Persons that are altogether black, to wit, when *Melas* is become inveterate, or that there be present the black *Alphus*; and yet notwithstanding all this while the part affected with the *Leuca* or the inveterate *Alphus*, hath continued white.

From what hath hitherto been said it is apparent and manifest, that by reason of the color there is truly an alliance and neer relation between these two Affects, *Leuca* and *Alphus*; and yet notwithstanding in other respects they much differ the one from the other, since that in *Leuce* there is a change not only in the color of the Skin, but of the flesh likewise, yea also a change in the very substance; whereas in *Alphus* only the Skin, or rather indeed the Scarf-skin, is changed in color.

The Causes.

For touching the generation of *Leuca*, *Galen* in his third Book of the Causes of Symptoms, and Chap. 2. thus writeth: *When the flesh* (saith he) *hath for some long time been nourished with blood both flegmatick, and withal glutinous and clammy, the flesh indeed as yet remaineth, but yet notwithstanding its form is changed, and turned into another species, and it becometh in a certain mean betwixt flesh that hath blood, and that that is altogether bloodless. But when it is become such it then so befalleth it that for the nutriment that is brought unto it from the rest of the body, it doth no more so much as attempt the converting thereof into the red species of flesh, but rather into the likeness of the flesh of Locusts. And so it cometh to pass, that very speedily it is rendered and becometh both white and flegmatick, and that not only in part, but wholly; in regard that it cannot convert the nutriment into a redness, and because that withal that flegmatick humor continually floweth thereunto.* And therefore what kind of flesh (even from the beginning) the Locusts have, (and almost al kind of Oysters) the like (from this transmutation) have they that are defiled and fouled with *Leuca*. For so they cal this vice of the flesh, imposing, to wit, the name from the white color, like as they give the name unto black and callous flesh from the Elephant.

But as touching the generating of the *Alphi*, *Galen* immediately subjoyneth, that the generation of them (together with the vices aforesaid) are of the like kind, but yet so notwithstanding that under them the whol flesh is not vitiated, but only in the superficies of the body there are as it were certain scales fixed and fastened.

But now *Alphus* is twofold; the white that proceedeth from flegm, and by the Arabians is called the white *Morphæa*; and the black that is generated from a melancholy humor, and is called the black *Morphæa*. But yet notwithstanding some there are that constitute other colors also; and they say that the Skin is sometimes changed unto a citrine yellowish color, and sometimes likewise unto a red, according unto the diversity of the corrupt humor. And indeed what they say is not altogether frivolous and to no purpose: for the Skin (true it is) is changed oftentimes, not only unto a white color, or a black color alone; but also very frequently unto a citrine and yellowish color.

The Antecedent causes of these Vices are Humors of the same kind heaped up in the Veins, and by Nature driven forth unto the circumference and superficies of the Body. But now those humors proceed from a default and error in the sanguification; which happeneth either by reason of an ill course of Diet, or else from some sickness and distemper of the Liver. And yet notwithstanding unto the black *Alphus* there concurreth likewise (and that more especially) the vice and distemper of the Spleen. But now with this malady men are more usually surprized and set upon than women. For in women those vitious humors are wont to be evacuated together with the monthly or menstrual purgation. Children are likewise less infested with this malady, in regard that their bodies are hot and moist, and therefore the less apt to breed these kind of Humors; their bodies are likewise open and permeable, and consequently most fit for insensible transpiration.

Signs Diagnostick.

Those Diagnostick Vices are known by the change of the color of the Skin. And indeed the signs of the black *Alphus* are manifest, in regard that there are broad blackish spots (scaly as it were) here and there spread, and dispersed up and down throughout the Skin. But because in *Leuce* and the white *Alphus* there is every where, and on al sides, a white color, these two vices are therefore to be distinguished. In the white *Alphus* the hairs in the place affected retain their natural color; but in *Leuce* there arise white hairs, like unto the soft and tender woolly hairs in yong Children. And likewise in *Leuce* the Skin is more depressed. Moreover in the *Alphi*, if the Skin be pricked with a Needle, there issueth forth blood; but in *Leuce* that which floweth forth is not altogether blood, but a certain waterish and white humor. And lastly, in the *Alphus* the spots are not continued, but disjoyned; but in *Leuce* they are altogether continued,

nued, by reason of the equal vice of the Skin underneath, and the flesh.

Prognosticks.

1. The *Vitiligo* (to tel you the truth) hath in it no danger of death; and yet notwithstanding it is a very filthy and loathsom affect.

2. If it be cherished by any default of the Liver or the Spleen, the Malady is then the harder to be cured.

3. *Leuce* is more difficult to be cured than *Alphus*; and the *Alphus* likewise that hath been of long continuance is more easily cured than *Leuce* that is but newly beginning.

4. That *Leuce* which waxeth not red when it is rubbed, and being pricked doth not bleed, is incurable.

5. That *Leuce* likewise is incurable which seizeth upon, and possesseth a large and spacious room, is of long continuance, and groweth and encreaseth every hour; and also, when all the Aliment that floweth thereunto is corrupted.

6. On the contrary, that *Leuce* that hath yet some kind of redness left in it, and is but smal, is curable.

7. That *Leuce* that is in the hand, or the foot, is of difficult Cure.

8. The white *Alphus* is likewise more easily cured than the black. And in the general, look by how much the color recedes from the Natural color of the body, by so much the more is the Malady the harder to be cured.

The Cure.

This Malady is cured if the Humor that exciteth it be wasted and consumed; and if a course be taken to hinder the further afflux of the like humor unto the skin; and this is done if care be taken that the humor that is already present in the body may be evacuated; and such a course likewise taken, that may prevent the generating of any new humor for the future.

In *Leuce* and the white *Alphus* there is no need at al of Venesection. For the blood doth not here superabound, but that which too much aboundeth, is the thick and cold humors: which are to be prepared by those Medicaments that heat, cut, and cleanse; and such as these are made and provided of Hyssop, Betony, the opening Roots, Stoechas, and others of this kind: and they are afterwards to be evacuated by those Medicaments that purge forth flegm; such as are Agarick, Mechoacan, Turbith, Colocynthis, and the like. *Avicen* maketh use likewise of Vomitories, and Diureticks, that is, those Medicaments that cause and provoke Urine. And then in the close and conclusion we are to administer Treacle, to consume and waste the cold crude humors.

Before Topicks may be applied in *Leuce* the place is first of al to be wel rubbed with course rough cloaths, that so the Medicaments may the better penetrate. Let the Topicks be so ordained and appointed, that they may cleanse, discuss, and draw the blood unto the affected part; such as are those that make red the place, which are very fit and proper in *Alphus*; but those that are stronger, and blisterers, and as it were Caustick, are required in *Leuce*.

Those Medicaments that cleanse, are, Lupines, the seed of the bitter Vetch Orobus, Gentian Root, Beans, Figs, bitter Almonds, the Asphodel or Daffadil Root, Alyssum or Madwort, Nightshade, Sulphur, Pellitory, wild Cucumber Root, and Briony Root.

Those things that attract and draw the blood, rubefie or make red the part, and that likewise excite and raise Blisters, are, Mustard seed, the Herb Rocket seed, Thlaspy or Treacle Mustard seed, Nitre, Euphorbium, Cantharides, the Root of Water Dragon, and other such like, that we have elswhere mentioned and explained.

From these there are divers Compositions to be made and formed. As,

Take *Root of the sowr Sorrel, wild Cucumber, of each one ounce; the greater Celandine, and Fumitory, of each one handful; boyl them in Water, and a third part of Vinegar; and then let the place be washed with the Decoction; and afterward anointed all over with this Unguent,* Viz.

Take *the Juyce of the greater Celandine, sowr Sorrel, Fumitory, and Scabious, of each one ounce and half; Mustard seed one ounce; the fat of a Hen as much as will suffice, and make an Unguent.*

Vesicatories or Blisterers, either of Mustard, or of the Flyes Cantharides, or such like, in *Alphus*, are to be held and kept at least so long in the part affected, until there be sensibly perceived a certain kind of stinging and biting; but in *Leuce*, so long until that the Scarf-skin be parted asunder, and that Blisters be excited and raised.

In the black *Alphus* let the place (the Patient being in a bath) be anointed over with the Pouder of Mustard seed mingled with Water, and made up into the form of a Pultis; and let it be so long there detained until there be felt and perceived a certain mordication or biting: or else let the Pouder of Mustard seed mingled with Sope be somwhat dissolved in Water, and so spread and anointed upon the part. Or,

Take *White Sope one pound; slice it, and let it be so dried that it may be reduced and made into a Pouder. Then add thereto Bean-flour, the meal or flour of Lupines, of each three ounces; Mustard seed one ounce; the Crumb of white Bread one ounce and half; let them be mingled well together with the Juyce of sowr Sorrel.*

But in the first place, it is mainly requisite that the Patient be careful in his Diet, that so the faults

of the blood may be corrected and amended. He must for this purpose feed upon meats that afford a good juyce; and he ought carefully to abstain from al sorts of salt meats, meats that are smoak-dried, and meats that are acid, thick, viscous or clammy. The place affected is dayly every morning to be wel chafed and rubbed, either with a rough course Linen cloth, or else with the hands, being first al over wet with the Oyl of bitter Almonds.

Chap. 30. *Of the Tumors*, Impetigo, *and* Lichen.

WE have already told you above in the 28. Chapter, That *Celsus* his *Impetigo* is nothing else but the *Lepra* of the Greeks. But now the *Impetigo* of *Pliny*, and that we likewise meet with in divers others of the Latins (and of which it is our purpose here in this Chapter to treat) is the same that the Greeks cal *Lichen*.

Mentagra

Unto these *Lichens* there likewise belongeth that that *Pliny* calleth *Mentagra*; touching which he thus writeth in his 26. Book, and Chap. 1. *Even the very face of men* (saith he) *is now sensible of Diseases that are altogether new, and in al former ages unknown, not only in* Italy, *but likewise throughout almost all* Europe. *Neither is it in all parts of* Italy *that these Diseases run up and down, neither throughout* Illyria, *or* France, *or* Spain, *as here at* Rome, *and the parts adjacent, where they most especially prevail and spread themselves; being (the truth is) altogether void of pain, and having in them no danger at all of death; but then they are so foul and filthy, and they so defile the face that any kind of death is to be preferred before this impure Affect. The worst and most grievous sort of these they cal* Lichenes *by their Greek name; but in* Latine *(in regard that the said Affect arose especially from the Chin) they first of all only in a jesting and sporting manner (as too many there are that are Naturally apt and forward to make themselves merry with the miseries of others) but soon after they commonly (and as by a generally received name) cal it* Mentagra, *because of its rise, as I said before, principally from the Chin) seizing upon, and in many places overspreading as it were the whol Countenance, the eyes alone being free, and thence descending both into the Neck, the Breast, and the Hands, together with a filthy kind of bran that it causeth unto the Skin. This Plague (if I may so cal it) was altogether unknown unto our Ancestors, and our Fathers before us were never sensible thereof. And it first of all crept into* Italy *about the middle of the Reign of* Tiberius Claudius Cæsar, *one* Perasinus *a Knight of* Rome, *and being then Quæstor, having been in* Asia, *and thence bringing along with him the contagion thereof. Neither were the Women only sensible of this Malady, or the Bond-slaves, or the mean Plebeians, or the middle rank of Citizens; but even the Nobles themselves catcht it by the swift and secret conveyance of a Kiss; and in many of them (those especially that had submitted themselves unto the Cure that was then practised) the Cicatrice was more foul, deformed, and unsightly than the Disease it self. For they were cured by Caustick; that so the body might not be burnt even to the very bone, where the Malady proved rebellious and refractory. And out of* Egypt, *from whence it first sprang, there came hither unto us such Physitians as undertook the curing of such Diseases; and the pains they took in the Curing of this one only Malady was very advantagious and gainful unto them. For certain it is, that* Manilius Torquatus, *one of the Prætorian Order, when he was sent Embassador into the Province of* Aquitain, *gave two hundred Sexterces for his being cured of this same Disease.* Thus *Pliny*.

There are some indeed that reprehend and blame *Pliny*, and that assert that many yeers likewise before the Reign of *Claudius Cæsar* these *Lichenes* were wel known unto the Grecians; because that *Hippocrates* in the third of his Aphorisms, Aphor. 20. and in his second Book of Womens Diseases, maketh mention of *Lichenes*; and that it is probable that the Malady vexed *Italy* in like manner; forasmuch as *Galen* also in his fifth Book of the Composition of Medicaments according to the places, Chap. 7. maketh mention of these *Lichenes* in the Chin; and yet notwithstanding he hath not one word of their rise and beginning under the aforesaid *Claudius*; and the truth is, that most of those Authors out of which he citeth the Medicinal Remedies against this same Disease, lived before *Claudius Cæsar*. But for this we must here know and take notice, that the *Lichen* is twofold; the one is that which *Hippocrates* & the other Greek Physitians before the time of *Claudius* the Emperor make mention of; and which *Pliny* (with al other the Latines, *Celsus* alone excepted) calleth *Impetigo*; the other that which was before the time of *Claudius*, and altogether unknown, the which others cal *Lichen agria & fera*, or the wild *Lichen*; but most of them have named it *Mentagra*. And this distinction *Pliny* seemeth likewise to have observed, in his Book 20. Chap. 1. and 9. and Book 22. Chap. 25. and Book 23. Chap. 7. and elswhere; and to have called these *Lichenes* of the Ancient Greeks *Impetigo*; but this new kind he calleth only by the single and bare name *Lichenes*, to wit, that so he might not (with the vulgar) make use of the word *Mentagra*, being the name that was at the first jestingly and corruptly imposed upon it. And that this latter sort of *Lichenes* was held to be contagious and Epidemical, *Galen* seemeth sufficiently to hint this unto us, when he writeth, and assureth

assureth us in his fifth Book of the Composition of Medicaments according to the places, Chap. 7. That one *Pamphilus* by the curing of the *Lichenes* got good store of Wealth at *Rome*, when the Disease *Mentagra* (as the vulgar cal it) raged and prevailed here in the City. Both kinds of this Disease *Celsus* in his fifth Book, and Chap. 28. seems to comprehend under the name of *Papulæ*, when he thus writeth: *There are* (saith he) *of* Papulæ *two sorts; the one whereof is, in which the Skin is exasperated by the smallest Pustules, and becometh red, and is gently and lightly corroded; having the middle part of it a little smoother, and creeping along but very slowly: and this same Malady most usually beginneth in a round manner; and for the same reason it proceedeth and creepeth along after the same round manner and fashion. But now the other is that which the Greeks call* Agria, *that is,* Fera, *or wild. In the which indeed the Skin is likewise but far more exasperated and exulcerated, and is more vehemently corroded and gnawed, and thereupon becometh red. And somtimes it also sendeth forth Hairs.* Thus far *Celsus*: All which agreeth very wel with that which *Galen* asserteth in his fifth Book of the composition of Medicaments according to the places, Chap. 7. as likewise *Paulus Ægineta* in his fourth Book, Chap. 3. and *Aetius* writeth in even very same (where he treateth of *Lichenes*) Tetrab. 2. Serm. 4. Chap. 16.

What Lichen *is.*

But now *Lichen* or *Impetigo* (that we may give you the general description thereof) is a roughness of the Skin with dry Pustules, and with an extream itching; creeping forward unto the neer adjacent parts, and in a short space much extending it self.

The Causes.

The Cause is a serous or wheyish, thin, and sharp Juyce, mixed together with a thicker humor. Now this humor is generated either from a bad and corrupt kind of Diet, and salt and sharp meats; or else also from the heat of the ambient Air; which being afterwards thrust forth unto the Superficies of the Body, it there exasperateth the same, and as it were superficially exulcerateth it. And this happeneth more especially in the spring time; whereupon it is, that *Hippocrates* (in the third Book of his Aphorisms, Aphor. 20.) reckoneth up *Lichenes* among the Diseases of the Spring. It likewise now and then happeneth in the Winter time, if by the Air the Pores of the Skin chance to be close shut up, and that sharp and salt humors be therein detained. And yet notwithstanding this Malady may likewise proceed and be contracted from Contagion, or Infection.

The Differences.

Now there is a twofold sort of *Impetigo* (as we told you before out of *Celsus*) the one whereof is more mild and gentle, in the which the Skin is less and by the least sort of Pustules exasperated; and it hath its middle part somwhat more smooth; and it creepeth forward but very slowly. The other that which the Greeks cal *Agria*, the Latines *Fera*, or wild; in the which the Skin is more exasperated and exulcerated.

Signs Diagnostick.

The *Impetigo* is known by this, that the Skin is made hard, dry, rough, and as it were ful of scales: there is likewise present an itching, and the Malady groweth broader from day to day; and from a very smal and inconsiderable beginning it diffuseth it self unto an extraordinary great breadth.

The Prognosticks.

1. This Affect is not in the least dangerous; and that which is newly begun, and mild, is very easily cured.

2. But that *Impetigo* that is called *Agria*, or the wild *Impetigo*, and that which ariseth from a worse kind of humor, is not to be cured but with much more difficulty; and it may soon pass and turn into the *Lepra* or Leprosie.

The Cure.

Such a kind of Diet ought to be ordained, that will not heap and treasure up such like vitious humors, to wit, those that are salt, and sharp.

Moreover if there be any signs, that many of these kind of vitious humors do abound in the body, they are then by convenient Medicaments to be altered, and evacuated.

As for Topicks; the Spittle of one that is fasting (if the part affected be therewith anoynted) healeth and helpeth a mild and Recent or new begun *Impetigo*; and so likewise doth that liquor or moysture that sweateth forth of green Wood while it is burning; as also the Leaves of Wall-Pellitory, or the Root of sour Sorrel bruised with Vinegar: as also the Gum of Prunes, if the part be anoynted therewith; that which is here of singular use and benefit, is, the Oyl of Eggs, and the Oyl of Tartar by draining; especially if mingled together with other fit and proper Remedies. Or,

Take Oyl of Roses one ounce, Tupentine washed in Rose Water, three ounces; Oyl of the Yelks of Eggs six drams, and Oyl of Tartar by draining two drams; and mingle them. Or,

Take Unguent Diapompholyx, one ounce; the White Unguent of Camphire half an ounce, Oyl of Tartar by draining two drams; Mingle &c. Or,

Take Oyl of Wax one ounce, Oyl of Eggs three drams, and of Tartar by draining two drams; Mingle, &c. Or,

Take

Take Frankincense, Ammoniacum, of each half an ounce, Oyl of Yelks of Eggs two ounces, Wax half an ounce; Mingle them, &c. Or,

Take live Sulphur one ounce, Frankincense and Myrrh of each two drams, Camphyre one dram: bruise them into a very smal and fine powder, and add of Borax one scruple, Rose Water a Quart; and destil them. Or,

Take the Flour of Cicers one ounce, Alum half an ounce, Honey as much as wil suffice, make an Unguent. Or,

Take the Raddish root, make it hollow by taking forth as much of the pith as you please; and then fill it up with Salt, Mustard, and Wine, let them stand for the space of one whole night; and then anoynt the *Lichenes* with the Liquor. Or,

Take Chalk beaten to a powder, and let it be mingled with the Juyce of Sengreen in the manner of a Liniment, with which let the place affected be anoynted.

But if the *Impetigo* be fierce, contumacious, and of a long continuance, then there wil be need of such Remedies as do cleanse more forcibly. And here we must commend unto you (as that which is very efficacious) that liquor that is destilled out of the Oyl of Tartar *per de liquium* or by draining, and Quick-silver; as for example,

Take Oyl of Tartar by draining half a pound, Quick-silver two ounces, destil them by a Retort. The Quick-silver wil first come forth; and after it a Water that is excellent against all contumacious and stubborn *Lichenes*. Or,

Take Turpentine washed in Rose Water one ounce, Oyl of Roses half an ounce, Swines Fat three drams, live Sulphur two drams, Nitre a dram and half, Alum, Sugar, Salt, of each one dram, Seed of Stavesacre, Litharge, of each one scruple; Yelks of two Eggs, Wax as much as wil suffice, and make an Unguent. Or,

Take the Flour of Darnel one ounce, Stavesacre seed two drams, the Spume or froth of Silver six drams, Cerus two drams, burnt Lead, and Antimony, of each a dram and half, Swines Fat one ounce, the Juyce of Scabious and of Lemmons, of each six drams; Quick-silver extinguisht or kil'd with Hogs Grease half an ounce, Oyl of the Yelks of Eggs, and Oyl of Tartar by draining, or (as it is usually prescribed) *per de liquium*, of each two ounces; Mingle and make a Liniment. Or,

Take the Leaves of Willows, of Mallows, of the Bur, of the Ivy Leaves, of each one handful; boyl them in red Wine. Let the place be washed with the Decoction; and after the washing, let the leaf of the Bur be laid thereon.

This following Unguent is likewise commended by *Valescus* and *Guido*; *Viz.*

Take the Seed of Juniper shaken wel together, one ounce, boyl them, and to the straining add of Hogs Grease six ounces, Turpentine one ounce; dissolve all over the Fire. When they are removed from the Fire, and cooled, let the watry part be poured off from them, and then let the remainder be diligently stirred about in a Mortar, adding thereto of live Sulphur one ounce, and so make an Unguent.

But if so be that the Malady wil not yield, nor be removed by these Medicaments, but that the part become Callous, we must then make use of Excoriatives, such as *Pamphilus* heretofore used at *Rome*; touching which, and other the like Remedies against the *Impetigo*, we are to consult *Galen*, in his fifth Book of the Composit. of Medicaments according to the places, Chap. 7. and *Aetius*, Tetrab. 2. Serm. 4. Chap. 16.

Chap. 31. *Of* Gutta Rosacea.

A Tumor neerly allied to this *Impetigo* is that which the more modern stile *Gutta Rosacea*, and others *Gutta Rosea*; the *Arabians Albedsamen*, or *Alquasen*, and others likewise *Albutiqaga*, which is a spotted redness, or rather a redness with Tubercles, with which the Cheeks, the Nose, and the Face is defiled and polluted, as if it were all to be sprinkled with Rosie drops. And sometimes these Tubercles get a growth and increase, in so much that the Face becometh unequal, and frightful to look upon, and the Nose augmented unto an extraordinary bigness, and deformity. There lived a yeer or two ago (not far from *Dresda*) a man affected with this Malady, whose Nose grew to such a vast greatness, that it hindred him in his reading; which Malady brought him to that pass, that in the yeer 1629. he was content to have some certain parts and small parcels of his Nose pared away and quite cut off.

Nicholaus Florentinus Serm. 7. Tetrab. 6. Summ. 2. Chap. 15. maketh three Differences of this Malady. *For there is sometimes present* (saith he) *a preternatural redness without any Pustules, Bladders, or Ulcers; and this we call absolutely a red Face; and sometimes this redness is accompanied with Pustules, or Bladders, and then it is called a Pustulous or Bladdery redness; and sometimes it hath attending it an Ulcer; and then we call it an Ulcerous redness.* And this last Difference seemeth very little to differ from that Affect that we call *Noli me tangere*; which they thus describe, to wit, that it ariseth in the Face, and especially above the Chin, neer about the Mouth, and the Nose; and they conceive that it is so called, in regard that (even by those Remedies that seem most fit and congruous) it is rather irritated then any waies mitigated, and notwithstanding all the means that are used, it is more and more carried on by eating and consuming the sound parts. And hereupon it is likewise, that in one and the same Chapter they treat both of *Gutta Rosacea*, and the *Noli me tangere*.

tangere. There is notwithstanding another Affect which they likewise vulgarly cal *Noli me tangere*, touching which we have already spoken above in the 20. Chapter.

The Causes.

The Cause of this Affect is acknowledged to be a hot blood; and the same is likewise thick and gross, and generated through some default in the Liver, that producetb such like blood; the which being carried especially unto the face (as otherwise we see, even in blushing, the blood is easily and soon carried thither, and there diffused) whenas by reason of its thickness it can neither retire back again, nor yet be discussed and scattered, it there sticketh fast in that place; and first of al it causeth a red color of the Face, and soon after likewise (if the said Malady continue long) it generateth red Pustules. Now this distemper happeneth unto some through a default and somthing amis in their Natural Constitution; and these let them live never so soberly and temperately, yet notwithstanding they are nevertheless subject and liable unto this Affect. But however for the most part this evil is contracted and procured by such persons as are addicted to the pot, and given over to drunkenness and swilling; and they are not only those that are excessive drinkers of Wine, but likewise such as exceed in drinking of Beer: and I once knew a Student that was notoriously affected with this Malady, and he had gotten a most foul and deformed Face. This man travelling afterwards into *Italy* and *France* (where there is not that plenty of Beer) at his return home again was much the better, and far less afflicted with the aforesaid Malady than formerly he had been. For Beer is much thicker than Wine, and therfore it also breedeth and supplieth a more thick and gross blood.

The Prognostick.

This Malady is very hardly cured, and especially if the Face be ful of Pustules, and as it were exulcerated; and for the most part it accompanieth the person that hath it so long as he liveth.

The Cure.

Now this Affect is not any other way to be cured, but by taking away the fault of the blood, and what is amis in the Liver. For albeit that the containing cause (as we cal it) of this Malady may be dissipated in the Face; yet notwithstanding it wil not be long ere there be made a new and fresh supply of the same matter. And therefore there must not only be an evacuation of the blood and the cholerick humor (which for the most part is mingled together with the blood) and Cupping-glasses with scarification oftentimes fastened and affixed unto the Shoulder-blades; but especially and in the first place, the extream heat of the blood and liver is to be brought unto a due and fit temper, and the obstructions of the Liver are to be opened; touching which we have sufficiently spoken before, in the third Book of our Practice, Part 6. Sect. 1. Chap. 1. touching the hot distemper of the Liver, and there likewise, Chap. 2. of the obstruction of the Liver. Those Medicaments that are made and provided of Strawberries, Cichory, and whatsoever Compositions that have in them any of the said Cichory, are here most useful and proper.

As for Topical Remedies, let them be cooling, when the Face is only red, and not yet defiled with Pustules; but if with the redness there be also Pustules accompanying it, then the Medicaments ought likewise to be such as have in them a power and vertue to discuss.

Now these Remedies are administred in the form of Waters and Liquors, as also of Liniments and Unguents. As first thus:

Take the Root of Solomons Seal three ounces; Flowers of Elder, of the Valley Lilly, of the bitter Mushroms, of each six ounces; white Tartar an ounce and half; white Wine a pottle; Camphire two drams. Let them stand infusing in the Wine ten daies, and afterward destil them.

Take Wheaten Meal as much as you think fit, Goats Milk one quart; make hereof Dough, and making it into Loaves bake them in the Oven; and let this Bread be again macerated in Goats Milk for the space of twelve hours. After this add the Whites of twenty Eggs, Camphyre one ounce; burnt Allum two ounces; Destil them, and make a Water. Or,

Take Strawberries a pint, Goats Milk a quart, the Whites of twenty Eggs, the Seed of Quinces two ounces, Camphyre two drams, Allum and Sulphur, of each half an ounce; mingle and destil them.

Lac Virginis (as they cal it) is likewise very good for this purpose, made of one part of Litharge, and three of Vinegar. But this following is more efficacious:

Take Litharge half an ounce; Vinegar four ounces; let them boyl to the consumption of the third part; and in another Pot boyl of Salt and Allum, of each half a dram; Frankincense one scruple; Rose water half a pint: Mingle both these Liquors, and pass them through a Linen strainer; and keep it for your use. Or,

Take Sulphur two drams; common Salt, and Camphyre, of each half a dram; Cerus, and Litharge of Silver, of each two drams; make them into a Pouder, and then mingle them carefully with the Water of Bean flowers, Rose water, white Lilly Water, the Water of Solomons Seal, of each two ounces: Mingle them, &c. Or,

Take Camphyre one dram; pour unto it into the Mortar by a little at once, and stirring it wel about,

about, of the Oyl of sweet Almonds three drams; afterward pour thereunto of the Oyl of Tartar by drawing two drams; and then moreover add of the Yelks of two Eggs, and mingle them wel together. After this add of *Saccharum Saturni* or Sugar of Saturn, half a dram; mingle them with al possible care, and then at the length pour in unto al the aforelaid (by a little at once) the Water of Bean flowers, of white Lillies, and of Strawberries, of each two ounces; and so mingle them al wel together. Or,

Take Litharge one ounce; Allum three drams; Ceruss half an ounce; Vinegar two ounces; the Water of Roses, and Plantane, of each four ounces; boyl them until a third part be wasted away, then strain them; and to the straining add a little of the Juyce of Lemmons; and with this mixture let the Face be anointed in the Evening. Or,

Take the Kernels of Peaches clean peeled, bitter Almonds blanched, of each in number six; beat them wel in a Mortar with a little milk; and then let their milky Juyce be presséd forth; unto which add of burnt Allum as much as a Nut. Afterward take of Quick-silver as much as a great Pease in quantity; which together with Spittle shake wel, and stir it about in the Mortar until it become black, and be as it were mortified; and then mingle it carefully with the former Liquor, with which about bed-time let the Face be anointed; and then in the morning following let it be washed with Rose water, or the Water of Bean flour. Or,

Take the whitest Tartar, Allum, and Nitre, of each four parts; Sulphur one part; bruise them wel, and then Calcine them; and in a Cellar from them make an Oyl *per deliquium* (as they speak) or by drawing. Or,

Take Kernels of Peaches hulled four ounces; the seed of Gourds peeled two ounces; let them be bruised, and then the Oyl pressed out of them; with which let the Face be wel anointed both morning and evening, and afterward washed with Rose water, and Bean flour Water, and the Water of Solomons Seal. Or,

Take Camphyre, Litharge, burnt Allum, of each half a dram; live Sulphur a dram and half; White Vitriol, and Frankincense, of each one dram; let them be poudered, and carefully mingled with Rose water, and Bean flour Water. Or,

Take Live Sulphur one ounce; Choice Frankincense three drams; Myrrh two drams; Camphire one dram; Ceruss half a dram; Pouder them al very smal, and pour thereto of Rose water one pint, mingle them; and when the Patient goes into his Bed let his Face be anointed with the said Liquor; and the morning following let it be washed with the water of the infusion of Bran. Or,

Take Oyl of Tartar one dram; Sulphur two drams; Camphire half a dram; Ceruss and Litharge, of each half an ounce; Rose water as much as wil suffice; and so let them stand in the Sun in a Glass close stopped. Or,

Take one whol Egg, and put it into the strongest Vinegar for four daies, until the shel be softened; afterward take forth the white, and fill it up with Frankincense, Mastick, and Ceruss, of each one dram; mingle them, &c.

Chap. 32. *Of Crusta Lactea, Achores, Favi, Tinea, Ficus, Helcydrium, Psydracia, and Phthiriasis.*

OUt of the Humors mingled together there are likewise generated both Tumors and Ulcers in Infants, that seize especially upon their Heads; touching which we have already treated in the fourth Book of our Practice, Part 2. Chap. 3, 4, 5. where we handled the Diseases of Infants, and therefore I conceive it altogether needless here to repeat any thing of what was there at large delivered. I shal only therefore here further acquaint you with these few things following. The first whereof is this, That these Affects here propounded, as likewise those which we have next of al explained, are indeed by the most referred unto Tumors: and yet notwithstanding (because there is here an Ulcer evermore conjoyned with these Affects, and the truth being that the Ulcer seemeth rather to have in it the Nature of a Disease, than the Tumor hath, which is indeed but very smal and inconsiderable) we judg that they may alike fitly and properly be referred unto Ulcers. But yet however our purpose is to continue the same Method (and as I may so say, to spin the same thrid) that we find begun by most Authors, and according to their guidance and direction. And moreover, as for what concerneth the Affects here propounded, what we are to understand by *Crusta Lactea*, and what we mean by *Achores*, *Favi*, and *Tinea*, we have already told you in the place before alleadged: as for *Helcydria*, *Psydracia*, and other the like Affects of the Head (comprehended under the general name *Exanthemata*) they are al together handled by *Galen* in his first Book of the Composition of Medicaments, according to the places affected, and the last Chap. but by the rest of the Greeks in divers and distinct Chapters. *Halyabbas* seems to comprehend them al under the name of *Tinea*, whenas in the eighth Book of his Theory, and Chap. 18. he thus writeth: *But these Ulcers* Tineæ (saith he) *are very smal, and they happen unto the Head; and there is in them a bladder that hath many species and kinds. The first whereof is that we cal* Favosa, *which hath its original from a salt flegm: the sign whereof is this, That there is an Ulcer whereby the Skin of the Head is perforated, and ful of little holes,*

in

THE THIRD DISCOURSE.

Of Atomes and Mixture.

Chap. 1. *Of Atomes.*

NOT only Words (like Money) are current by uſe, but alſo Opinions; and thoſe Opinions of Philoſophers which were in requeſt in daies of old, have been by the ſpringing up of other Opinions baniſhted with the Writings of the ſaid Philoſophers. There were anciently (by the Teſtimony of al Antiquity) moſt wiſe men, *Pythagoras*, *Empedocles*, *Democritus*, *Socrates*, *Anaxagoras*, *Parmenides*, and very many more, whoſe Opinions nevertheleſs are either altogether unknown, or ſuch are attributed to them as ſeem more like old Wives Fables, than Opinions becoming a wiſe man, as *Fr. Titelmannus* ſpeaks, *Lib.* 5. *Philoſ. nat. cap.* 15. which if they were by us rightly underſtood, peradventure we ſhould think them not altogether to be rejected; which nevertheleſs now at the firſt appearance, when they are not underſtood, are laughed at as abſurdities, and rejected as unworthy of Philoſophers. Truly *Ariſtotle* in his Works, every where recounts the Opinions of the Ancients, and ſharply oppoſes the ſame; but *Pererius* ingenuouſly confeſſes in *Lib. Comment. de rer. natur. princip. cap.* 16. That he cannot deny but that *Ariſtotle* in making Inquiſition into, and judgment upon the Opinions of the Ancients, was too hard and ſevere a Judg and Arbitrator. And in the ſame place he relates the Opinion of *Simplicius*, who conceived that thoſe ancient Philoſophers were accuſtomed to hide their Opinions under ænigmatical and allegorical obſcurities: and therefore *Plato* and *Ariſtotle*, fearing leſt rude perſons as were too dul-headed to underſtand their abſtruſe ſence, underſtanding them according to the firſt appearance ſhould fal into Error, did ſo handle their Opinions as that they might ſeem to common Readers to diſlike and reprove the ſame. Not to ſpeak of others, *Democritus* who lived when *Hippocrates* lived, as appears not only by the Epiſtles of *Hippocrates*, but alſo out of *Diogenes Laertius*, and *Pliny*, *Lib.* 30. *cap.* 1. was a man moſt ſtudious of Philoſophy, and diligently weighed the Opinions, not only of *Anaxagoras* (whoſe junior he was by forty yeers, as is reported) but alſo of the Outlandiſh Philoſophers, and many years together (to attain Wiſdom) he travelled ſtrange Countries, *Chaldæa*, *India*, *Perſia*, *Æthiopia*, *Egypt*, and heard and conſulted with the great and wiſe men of thoſe places, as it is to be ſeen in *Ælian*, *de varia Hiſtoria*, *Lib.* 4. *cap.* 20 Diogenes Laertius *in his Life*, Clemens Alexandrinus, *Lib.* 1. *ſtromat.* and Euſebius, *de præparat. Evangel. Lib.* 10. *cap.* 2. Pliny, *Lib.* 30. *cap.* 1. And during the long time of his Life (for he died in the hundred and ninth year of his age) he diligently examined al things, and did ſo excel in Philoſophy that he was called commonly *Pentathlos*, the Champion at five Games, viz, Becauſe he was eminent in Natural, Moral, Mathematical, and other Diſciplines; termed by *Hippocrates* in his Epiſtle to *Damagetus*, the *Wiſeſt of Men, the moſt Wiſe Man*, and in his Epiſtle to *Democritus*, *The moſt excellent Interpreter of Nature and the World*; and by *Ariſtotle* himſelf in 1. *de generat. & corrupt. cap.* 2. *text.* 5. he *is* preferred before al other ancient Philoſophers in the Science of Nature. And by the Senate and People of *Abdera* he was ſo highly eſteemed, that they

The praiſe of Democritus.

they write in their Epistle to *Hippocrates*, That they feared it *Democritus* should be sick the City of *Abdera* would become quite desolate; and in the same Epistle he is termed the *Body of Wisdom*. Yea, they called him *Philosophy* it self, as *Ælian* relates in the place fore-alleadged. And this alone argues his great care in the study of Nature, that *Pliny* writes *Lib.* 14. *cap.* 2. Whereas there are innumerable and almost infinite sorts of Vines, and almost as many as there are Fields, yet *Democritus* was the only man that conceived their kinds might be numbred, professing he knew al that grew in *Greece*. It is not therefore credible that so sagacious a Philosopher, a most wise man (as *Hippocrates* called him) one so useful to Humane Life (as *Pliny* calls him, *Lib.* 28. *cap.* 8.) should entertain such absurd Opinions as are at this day fathered upon him; nor is it (indeed) likely (to use the words of *Pererius*, *Lib.* 4 *Phys. cap.* 4.) that so discreet and wise a man, so many wayes commended by *Aristotle*, should beleeve and reach things so evidently false and absurd, not only secretly contrary to Reason, but likewise openly against the very Verdict or the Senses.

The Doctrine of Atomes a most ancient Doctrine.

Now amongst other Opinions ascribed to *Democritus*, *Empedocles*, and other most noble ancient Philosophers, is this; That they held Atomes or individual Bodikies to be the Principles of Natural things, from the various mixture whereof other Bodies have their Original. And this Opinion was a most ancient Opinion, and is now attributed to one *Mochus* a *Phœnician*, who is reputed to have flourished before the destruction of *Troy*; yea, and that it was the common Opinion of Philosophers before *Aristotle*, is apparent from the beginning of his Second Book *de Generat. & Corrupt.* *Aristotle* was the first that relinquished this Opinion, and held that those Atomes or smallest Bodikies were not only united in mixture, but also by mutual action and passion one upon another so altered and wrought upon, that they ceased to be what they were before their mixture, and were changed into a Body so similar, that every smallest part imaginable could be no longer called Fire, Water, Air, or Earth, but a mixt Body. Of which we shal speak more largely when we come to speak of Mixture. And although the Doctrine of Atomes and Indivisible Bodikies be commonly set out after an odious manner; yet if rightly explained it seems not absurd. Yea, the Reasons brought for this Opinion are not light or foolish, but strong and urging, and which can hardly be answered, as *Aristotle* himself confesses, *Lib.* 1. *de Generat. & Corrupt. cap.* 2. *text.* 6. and which he cannot certainly promise to answer, but he would try what he could do. And doubtless he knew he could not sollidly refute this Opinion, and therefore he used not proper and Physical Reasons as he ought to have done, but Mathematical and extravagant ones.

'Tis founded on Reason.

The Doctrine of Atomes explained.

Now I conceive the Doctrine of Atomes may be thus explained. In Natural things subject to Generation and Corruption, because there is a perpetual Interchange of Generating and corrupting, there must needs be certain simple bodies, each of a nature by it self, out of which the Compounds may be generated, and into which Compounds are again resolved. For *Democritus* seeing that Bodies Natural were neither made of nothing, nor made of Points, he was forced to hold they were made of the smallest Bodikies. Where it is to be noted, That *Democritus* did not enquire, Whether there were an individual Mathematical Magnitude; but whether there were Natural Bodikies of an indivisible smalness, out of a multitude of which gathered together a certain sort of natural Body does arise. These Bodikies are therefore termed the smallest particles in Nature, Atomes, *Atoma corpuscula*, indivisible Bodikies; because in the resolution of Natural Bodies there is no further progress to be made beyond these into any thing smaller; and contrariwise Natural Bodies have their original from these. Which Bodikies are indeed really in Nature, but are so smal as they cannot be discerned by the Senses. Of them *Plato* in his *Timæus* thus writes: Touching these so smal Bodikies we are thus to think, That if you take only one single one of a kind, there is none of them can be seen by us in regard of its smalness; but if many are collected together, their bulk and magnitude is discernable. For neither are those little Bodikies we see floating up and down in the Sun-beams such Atomes as we speak of, but compounded Bodies. Al the Learnedest Philosophers have acknowledged that there are such Atomes, not to speak of *Empedocles*, *Democritus*, *Epicurus*, whose Doctrine is suspected, perhaps because it is not understood. And *Galen* makes mention of them 1. *de Elemens. cap.* 9. And indeed every where amongst Philosophers and Physitians both Ancient and Modern, mention is made of these little Bodikies or Atomes, that I wonder the Doctrine of Atomes should be traduced as a Novelty. That I may not speak of others besides those whom I have already praised, who may be suspected as Contemners of the Ancient Philosophy, and desirous of Novelties; *Franciscus Aquilonius*, *Lib.* 5. *Opticæ defin.* 5. thus writes: Amongst

the manner of Atomes.

Many have held there are Atomes.

Elementary

Elementary Qualities, the two which are termed passive are exceeding far from the Nature of Light. For neither does Humidity signifie a Quality, nor Humectation an alteration. For humidity in the substance of Water is the same thing that fattiness is in the substance of Oyl; and as fat makes Greasie by being smeared upon a thing, so moisture moistens only by sticking to a thing. Again driness is only the defect of moisture, and exsiccation the consumption of Humor. And among the active Qualities Cold sends forth no coldness out of it self: which though it may to some seem strange, yet is it agreeable to reason, and experience manifestly demonstrates the same. For the coldest body that is (to feel to) as Ice, does send forth no sense of coldness to ones hand that is neer it; but al cold things are perceived to be so only by handling them. Which (to such as denied the same) I have often made appear by a pleasant experiment: for their eyes being blinded and their hand held forth, I would ask them if they felt the coldness of the Ice neer their hand. For sometimes they would say they felt somwhat when there was nothing near them; and otherwhiles they would say they felt nothing when the Ice was so neer their hand as it did almost touch the same. And a while after he saies; Heat seems to diffuse it self abroad like Light. Moreover, I account it (truly) most likely that from the kindled fewel a kindled vapor does flie abroad, which being secretly conveighed through the Air does heat every thing it touches, and also burns the same if it have any thickness. Hence it comes to pass that things set near a blazing fire are burned though they do not touch the visible fire it self, which is often seen in Paper and Tow; but much more apparently in Naphtha, Asphaltum, Amber, and such like, which draw the flame to them from afar. Hence also it comes to pass that the fire heats more strongly and fiercely aloft than beneath or on the sides, viz. Because the inflamed vapor attenuated by Heat endeavors to mount upwards. Which truly does not properly agree to a quality, but to a substance. Nor can you rightly say Heat is Light, but that which is hot. For that being by the force of heat rarefied becomes lighter; as that is heavier which by condensation of the matter is brought into a narrower compass. Hence also the true cause may be rendred, why in the Winter flames do blaze more lustily: for the surrounding cold hinders the heat from spreading it self abroad in the Air. And in the same Book, *Propos*it. 2. We must cal to mind what was said, *definit.* 5. of this Book, how that the Heat of the Fire is not carried along by a continual action, but is secretly conveighed through the Air, just as smels which breath out of odoriferous Bodies, and being received in the thin Air, and founded in a secret exhalation, are carried this way and that way by *bab nab.* So (I say) the fiery heat being carried in a certain kindled Spirit is thrust strait along, as much as the power of the fire is able; very speedily upwards, but the more slowly by how much the more downwards. But being set at liberty it wanders more freely through the Air, and is driven any way by the lightest motion, and by its sticking to them things never grow warm, as those which are placed by odoriferous bodies do smel sweet only by exhalations sticking to them. Soldiers in their Camps find this by experience, when having cut down a great deal of Wood they pile it up and set it on fire in the middle of a field, and stand round about the same. For they that have the wind on their backs do feel hardly any heat although they stand close by the fire, the fiery spirits being thereby carried unto the opposite side; which the wind could not do if only a quality were carried through the Air; for that being no body would give the wind a free passage through the Air. Thus far *Aquilonius.*

'tis proved that there are Atomes.

But what need we Authorities when the matter is plain enough of it self? For if we consult with Experience, which *Aristotle* so commended in *Democritus*, we shal find both the Generations and Corruptions of things to be made by Atomes, and that there are every where in Nature examples of the uniting and separating of Atomes. And since there is not only one kind of Atomes, but that they are various according to the variety of Bodies, I conceive it wil be best to consider them both in respect to the Elements so called, and in respect to bodies compound.

For in the first place, The Elements themselves are resolved into such Bodies, and the said Bodies joyning again do make up not only Compounds, but also the bulk it self of the Elements. Now these Atomes or indivisible Bodikies of the Elements do arise both out of the resolution and corruption of Compounds, and likewise out of the Terrene Globe (wherein are al Elements) and are carried up into the Air; whence proceed sundry mutations of the Air, and Generations and Corruptions, which variously affect both Man and Beasts, and Plants. For it is very true of the first Atomes or indivisible Bodikies, that if we take but one Atome of a kind there are none of them visible: but if many of them be gathered together their magnitude and bulk is discernable, which (as hath been said) *Plato* also teaches us in his *Timæus.* Since therefore these Bodies are most smal and subtile,

they do both easily pierce into other Bodies, and afford matter also to others.

Fiery Atomes or Bodikies. To run through al kinds of Natural Bodies, and first as to Elements; Fire insinuates it self into Iron and Water. The same being insensibly in the Summer mixt with the Air makes soultry hot weather; yea, and (as Experience shews) hath burnt up Woods sometimes. It is variously mingled also with other things, and according to its various commixture makes sundry sorts of things. Fire indeed of it self (as *Jul. Cæs. Scal.* teaches) neither shines nor burns; but that it shines and burns it comes to pass by the admixture of another Body, and the propinquity of the parts, by whose co-action in a smaller space the substance is greater, and therefore the force is greater. But being rarefied it burns not, nor does it shine. That smoak which ascends hath much fire in it. Nor yet hath it any burning Faculty, nor shines it at al with any light: and such things as are roasted on Spits are not touched by that fire which we see; yet are they so touched by fire, as that they are somtimes burnt to a Coal. Yet is not that fire visible which burns them. And the same *Scaliger, Exercit.* 325. *Sect.* 7. Fire is much more transparent than the Air, because it is thinner. The Fire which we use is yellow because of mixture. For there is fire in a vapor, in smoak, in burning coals, in a flame; and *Aristotle* cals a flame burning smoak, and that not amiss. For the flame seems to be no other thing than the meeting together and union of the particles of fire, the heterogeneal substances being separated. For whereas by reason of distance and commixture of Contraries the smal bodies of fire could not joyn together, the obstacle being taken away they begin to be united. Hence it happens that if the chamber where fire is kept be close shut the fire wil not flame, but as soon as the Air is let in, and those heterogeneal bodies are discussed, the flame breaks forth. Nor yet is flame absolutely pure, but contains in it self some heterogeneal Matter, which the color alone does shew. But that fire which is above the flame is purer; and therefore is not seen. For by reason of the different concourse of the Atomes divers bodies seem to arise which yet are of one Nature. The Fire is but one thing, yet undergoes divers names, according to the different concourse of its smal bodikies. The Concourse of many homogeneal bodikies of fire is requisite to make fire in such a condition as to shine and burn; which two things though fire does not, yet is it fire stil.

Aerial Atomes. Now Air is in al bodies almost. For since most Natural Bodies are porous, Air fils those empty spaces naturally. Not to speak of other things, some Metals are sounding, others not. And those which sound have Air in their pores, which is the subject of sound. So Woods are apt to admit sound, which happens only by means of the Air contained in them. And this is most frequent in dried Woods; because the watry moisture being consumed, which was unfit to receive sounds, Air comes into its place by its quality more fit to receive and advance sounds. And if a man touch a stick at one end, and put the other end to his ear, he shal hear a sound. Which comes to pass by means of the Air which is contained in them, seem they never so solid. And Soldiers are wont to try whether their Enemies are coming by clapping their Ears close to the Earth.

Watry Atomes or Bodikies. Water or moist Air (which is nothing but Air ful of the vapors of water) does so insinuate it self into wooden things that they wil even be thereby swollen in bulk. And therefore folding doors many times when the Air is moist, wil neither open nor shut. And tubs that leak being laid in water come to hold again, because the boards which were contracted and made chinks, are by the water distended.

Earthy Atomes or Bodikies. Finally, The Earth though it be thick, yet it insinuates it self by its smal bodikies into other things, and is mixed with them. So we see in Baths, Icesickles, and stoney substances grow to the Channels, so that a man might wel wonder how such a body could lie so long concealed in clear and transparent Water. If therefore Air and Water can so insinuate themselves into solid Bodies, and Earth can be so mingled in transparent Water as not to be discerned by the sight, why therefore may not fire do the same which is much more subtile? So that there is now no need to dispute how red hot Iron burns, since really it contains in it the Atomes or smal bodies of fire, which vanishing away it returns to its Natural actual coldness. For the same cause also Metals are melted, and afterwards growing cold become hard again. Of which we shal speak anon.

Alteration what it is. What heating is. Which if a man diligently consider, he shal observe, That alterations commonly so called are not mutations only in Qualities, but the participation of another Body: that the heating of water is its participation of fiery Atomes, by means of which also it hath the power to burn, which vanishing the water returns to its ancient coldness. Which also may be known even by Experience; for hot water shut up in Peuter Pots wil retain its heat ten hours and longer in the Winter time; by which means Beds are warmed in the Winter, and Gentlewomen

women travelling by Coach defend their feet from the Winters cold. For if the water had contracted only heat from the fire, that imprinted quality in a cold place, in a Vessel made of Metal, and in the cold air, could not continue so long a time. There are therefore (doubtless) fiery particles, which being shut up in a thick Metalline Vessel do for some time abide therein, before they can al leisurely creep out through the pores of a compact Body. So in the Summer time we are taught by this following Experiment, That Wine and Beer do not only contract an hot quality in the heated Air, but that they also receive into themselves fiery particles, viz. If two Vessels be filled at the same time with Wine or Beer, and both be plunged a good way into cold water, and then one be stopped, the other open, that Wine or Beer in the open mouthed Vessel is sooner cooled than that in the stopt vessel; which therefore happens because the fiery Atomes which did heat the Liquor being compelled by the force of contrary coldness do sooner exhale when they have a free passage than when by stopping the vessels mouth they are restrained. Yea, and it is not absurd to say the Air in our stoves is not only altered, but receives into it some of the substance of the fire. Nor is it impossible that the fire should pierce through the furnace, since air (not so subtile as fire) pierces both into Iron and stone Jugs. Yea, and the thing it self testifies thus much; for we see paper, cloaths, and other combustible things being held near the hot stove do oftentimes take flame. And if those supposed alterations are meerly such, how can heat and cold be in the same part of the water; and seeing no accident operates but by vertue of its form whence it flows, how can that heat springing from the fire act both upon the cold and upon other Bodies, the fire whence it came being now absent and quenched. Now whether is more absurd to hold that in water there is also fire, from whence as its proper subject heat flows? or to hold heat to be both in its own proper, and in a strange subject? And that this is true many most learned men have acknowledged, and amongst the rest *Averrhoes*, who in his B. *de Anima, text.* 115. writes: We must not think that water is heated remaining pure and meer water, nor that Air is cooled remaining meer and pure Air; but this happens by reason of hot or cold bodies being mixed with them. Also this is manifest in the cold air, which nips Plants less being stirred with winds than if it be stil and quiet. For the cold Atomes mixt with the air and sticking to the Plants do more hurt than when they are stirred. *Julius Cæsar Scaliger* grants as much, when in *Exercit.* 12. *Sect.* 3. he saies that Brass becomes hot by the parts of the fire entring into the pores thereof. The same *Scaliger*, *Exercitat.* 14. teaches us, That boyling water is fiery, or hath in it fire and dryness; and he writes that the fire exhales out of hot water: *There is* (saies he) *fire and dryness in hot Water, which in the steam ascending we perceive by our understanding, and by our sense also; for it burns. The heat which is in water is fire mingled with its contrary.* Yea, and *Galen* taught this long ago, who in his 1. Book *de Element. cap.* 6. saies, *I say that he who in the time of frost is warmed with the fire, does receive fire into his Body.* And that the substance of fire and air does penetrate into other bodies, this also argues that the digestions which are performed in dung or hot water can never be exactly accomplished in the Embers, whatever degree of heat you shal use; and because in an hot and dry subject a thing is easily burned, but not in an hot and moist. Also the Cure of burns, and of parts nummed with cold, as also other things congealed with cold do shew, that alterations hitherto so esteemed are not meer alterations, but the mixture of a certain kind of Atomes. For if a man shal put frozen Eggs or Apples into hot water (which should be done were it a meer alteration) they wil be spoiled: but if he plunge them in extream cold Water, the frost is drawn, and sticks like Ice upon the out side, and they are preserved. So those that travel in the Winter, as is wel known to the Inhabitants of *Norway* and other Northern Countries (nor is it altogether unknown to our people) and have their Members frozen as it were; if they come presently to the fire or into an hot room, they are very much hurt and exceedingly pained, and many times the part becomes gangrenated, the cold parts (I do not say the coldness, but the cold parts or atomes) piercing inward, and extinguishing the natural heat. But if their Members are first rubbed with Snow, or are plunged into cold water, the water or Snow do draw unto themselves by reason of similitude those atomes and petty cold bodies which had gotten into the part. Contrariwise, when any Member is any waies burnt, if it be plunged into cold water (which the Law of alteration requires) it is most certainly endangered. Contrarily 'twil be cured if it be put, not into cold but hot water, which may by similitude draw to it self those hot bodikies: and if the burning be not great, the Member may be held to the fire, or hot embers may be applied thereto. Of which *Fernelius*, 6. *de Method. Medendi, cap.* 20. As the fire, if a part which is burned be held neer the same, becomes a cure of the evil it self caused, and by drawing back the fire eases it of its pain; so

some

some things externally applied do by their heat draw out the heat of the fire, and so by ceasing the Inflammation they cure burnings. For fire and hot things do by similitude draw out the fiery Atomes. And for this very cause (as *Aristotle* writes in the 13. Probleme of the 24. Section) hot things are faster cooled in the Sun than in the shade, because the beams of the Sun draw out the fiery Atomes.

The Fire is no Accident.

But that same Opinion of *Thomas Fienus* is altogether absurd, who in his Apology against *Sanctacruz*, Page 50. saies, that this Fire of ours which we use (he cals it artificial and earthly, unfitly; since it is most natural and of the same substance with that Fire which is in other parts of the world, although it be in a thicker matter) is an Accident; and he conceives that those things which are said to be Fired, or those substances which men are wont to call Fire, as Iron, Coals, Flame, are indeed Substances: but that which is in them more than their own substance, by reason of which they are called Fire, or are said to burn, he denies to be a substance, and thinks that the fierineſs adds nothing to the burniug Iron, Wood, or Furnace, but an Accident, viz. a most intense Heat, and that he endeavors thus to prove.

First, He saies, a substance is not capable of more or less. That same firineſs in the Iron, Wood, Furnace, admits of more and less. *Ergo* it is no substance.

Secondly, When the Iron is red hot or the smoak flames, the whol Iron is fired, and the fire is in all the parts thereof. If therefore the fire were a substance, in all the parts of the burning Iron there would be another substance, and consequently one substance should be in another, and so there would be a penetration of dimensions; which is absurd.

Thirdly, He saies: When the Iron becomes red hot, either the substance of the fire comes into the Iron from without, or it is generated in the pores thereof. He conceives neither of these can be: Not the first, because neither the Coal of the fire because it is thick, and stirs not, but lies stil, nor the flame of the fire, because of its extream thinneſs and lightneſs, can enter into the hard substance of the Iron. Moreover, if the fire entred into the Substance of the Iron, when the Iron cools, the flame that went in should come out again: but no man (he saies) did ever see fire fly or go out of a cooling Iron. Also (he saies) the latter is impossible, because the substance of the Iron should be turned into the substance of the Fire; which is false, because the Iron remains Iron stil.

Fourthly, If the Iron became fire, it should lose its Heavineſs, Hardneſs, and Consistency.

Fiftly, A Substance is a Beeing subsisting by it self, not existing in another thing, nor inhering in any thing as its subject. But the fire by it self no where subsists, but is alwaies in some other thing, as in its subject, after the manner of accidents; and its subject taken away wherein it sticks, there is no such thing as Fire. *Ergo* it is an Accident.

Sixtly. Every Body of it self hath Quantity: for Quantity springs from matter, and the determination thereof from the form: But Fire hath neither it self any Quantity, nor hath it any determinate figure, but it hath only the Figure and Quantity of the subject wherein it inheres, as other accidents. Therefore it is no Body.

But this Error *Julius Cæsar Scaliger* long since observed and refuted in *Cardan, Exercit.* 10. For nothing is accidentally in any thing, which is not essentially, primarily, and of it self in some other; since every accident flows from a certain substance. And therefore since Heat is accidentally in the Iron, of necessity there must be a substance wherein it is primarily, and by which the Iron becomes hot: But such there can be none but the Fire. And if fire be a Quality, its first and proper subject must be some substance. But those reasons whereby *Fienus* was brought into that opinion are so slight, that I wonder so learned a man should thereby be moved so to hold.

For, in the first place, we deny that the firineſs in the Wood, Iron, Furnace, Smoak, receives more and less. But that the fire sometimes burnes more, sometimes less, happens by reason of the application thereof to the Patient. For Virtue united is stronger, and therefore Fire in a compact substance, as Iron, burnes more than in a thin substance, as Stubble or Straw.

To the second I answer: That Smiths can tell that Iron is porous; and therefore the fire can easily insinuate it self thereinto. And whereas *Fienus* denies the Iron to have pores; that is contrary to sense: for Smiths know how to distinguish the sorts of Iron, and discern Iron from Steel by the variety of the pores. Nor is that of any moment which he further objects, that if the fire were only in the pores of the Iron, the solid parts thereof should not burn, nor would the Iron be light all over, many parts thereof would be dark. For indeed

Fienus

Fienus was ignorant of the nature of the small individual Bodikies or Atomes, nor did he consider what dayly happens in Nature. For if Water can so penetrate into all the smallest parts of Wood, that there shall be no part thereof which is not moistened; Why may not the moist subtile fire much more pierce the Iron? And therefore to his third Argument we Answer, That the substance of the Fire doth certainly enter the Iron from without. For although the Coal it self stir not, and enter not into the Iron; yet the fire which is in the coal exhales in smal Atomes, and insinuates it self into the Iron. And the thinness of the flame does not hinder the same, but rather help it to enter the hard substance of the Iron. And when the Iron cools again, then the fire exhales out of it; which though it be not discerned by our bodily eyes (for who can see the pure Elements of Fire and Air?) yet Philosophers discern it sufficiently by the effect.

To the fourth I answer, the Iron is not made Fire, but it receives the same. Which while it does, it loses indeed its hardness and consistency, so that it may be bent and beaten by the Hammer, yea, and it may be melted.

To the fift I say; It is false that Fire no where exists by it self, but is alwaies in some other thing as a subject; which the sense teaches. And although fire be in the Iron; yet is it not there as an accident in its subject; just as when water is in a Vessel, it is not there as in a Subject.

To the sixt I answer; That the Elements of themselves have no determinate figure nor quantity, but they are determined and receive figure from the things which compass them about.

Contrariwise, Cold Atomes having no hot body mixed with them, being abundant in the Air in the Winter time, they cause extream cold, and congeal al bodies whereinto they insinuate themselves. *Refrigeration.*

Nor did the Ancients only teach, That these first Atomes of the Elements did variously spread themselves up and down, and penetrate into other bodies; but that of them also mixt Bodies were made; and they held them to be nevertheless immutable, and to retain their own Nature however they were mixed, and being separated from the things wherewith they were mixed they held their Nature entire as before. For thus *Lucretus* writes in his Second Book. *Of the Elementary Atomes mixture is made.*

What came from Earth goes back to Earth again,
And Heavenly parts do fly to Heav'n amain.
Nor does grim Death consume our Bodies so
As to destroy the Matter, but unsew
The joyned Parts.

Most Meteors (truly) are no other than a mass of Elementary Atomes variously congregated. For Exhalations and Vapors are not continued bodies, as is commonly thought, but crowds of infinite Atomes; which is manifest from the vapors arising from water which heats over the fire. For these though far off they seem to be a continued body, yet he which is neer at hand, or who walks on a Mountain top when the Air is misty, may even discern with his eyes that these vapors are not continued Bodies, but a throng of Atomes. A Cloud is nothing else but an infinite multitude of Atomes. For as when we see a smoak ascend from burning Pitch or any other thing, we think afar off that it is a continued united body; but if we come neerer and diligently look upon the smoak, we see that it is no continued, no nor contiguous body neither; and so it is with Clouds, which until the smal bodies are again joyned together (which happens in Rain and Snow) they are no continued bodies, but many millions of millions of petty Atomes or smallest bodies. And Clouds as they are of divers kinds, so when they grow together again divers things are bred of them, as Rain, Snow, Hail, Winds, Lightnings, and other Meteors so called. Somtimes nevertheless the Atomes of Bodies perfectly mixed are mingled amongst the Meteors. *The Meteors are made of Atomes.* *A Cloud.*

For there are (in the second place) Atomes of another kind besides the Elementary (which if any man wil term first mixt bodies, he may do as he please) into which as similar parts other compound bodies are resolved. And indeed in the mixture of Natural things, or that which happens in lifeless things, these bodies of which the mixt things consist are so broken and divided into smal particles, as that none of them can be discerned and known by it self. Also in al fermentations and digestions and coctions, which are made by Nature or Art, nothing is done but to reduce things into their smallest parts, and unite them as neerly as may be. Contrariwise, the Resolution of Natural Bodies, both that which is done by Nature, and that performed by Art, is nothing but the resolving of them into their smallest parts or Atomes. *The second kind of Atomes.*

But

Chymical Operations prove Atomes.

But Chymical Resolutions do in a special manner discover that there are Atomes, and teach sufficiently what little bodies there are. So Spirit of Wine pierces through writing paper four times double into the Alembick; and in Distillations and Sublimations such Atomes are raised from Plants and Minerals into the Alembick or Recipient, many millions whereof nevertheless when they joyn together again do sometimes hardly make one drop or sensible quantity of Liquor. Nor let any man here perswade himself when he sees a vapor rise out of water or Spirit of wine, or a Smoak arise out of Pitch, Sulphur, or burning wood, that these bodies are changed into Air; but the water, spirit of wine, and other bodies, are resolved into the smallest Atomes, which when they joyn together again, they turn to water, spirit of wine, or some other body again; which the Alembicks of Chymists and their Recipients do teach. Also whiles spirit of Vitriol and other Spirits are distilled, the Recipient Vessel is often ful of such smal, but not yet smallest bodies for two or three daies together, and every moment some millions of such bodies are present and follow one another. Yet a smal quantity of Liquor comes of them when they meet and are condensed; so that those Atomes which are present at the same moment, of which nevertheless there are some millions, do hardly constitute one drop. We see the same in other Resolutions. If a man set on fire a little bit of Pitch, and suppress the flame, an huge space of Air is filled with the smoak thereof, which is no one continued body, but a multitude of little Atomes or smal bodies. And what difference there is betwixt a body compact and resolved into Atomes, we may learn only by the putting out of a Candle. For if one blow out a burning Candle, the smoaking Snuf, which is hardly so big as a Pease, does presently send forth so great a quantity of Atomes that a great part of the Air is filled therewith. So flower of Brimstone melts into Brimstone; Mercury precipitate, or sublimate, or however resolved, does return again to living and running Quick-silver. So the water wherein Metal is dissolved, although it seem cleer water, and is so exactly mixed that it wil pass through a paper: yet the Metal preserves its own nature therein entire, and is easily precipitated to the bottom in form of a most very fine pouder, which is afterwards melted into a Metal again. So also if one Mass be made of Gold and Silver melted together, and they be so mingled in their smallest Atomes that no man would think them but one simple body; yet in the mean while in those smallest Atomes each Metal preserves its form and nature, and may be separated by *Aqua fortis*, and reduced into its former Nature. Hence the cause of many Chymical Operations and things done in Chymistry may be rendred. If to Lead any way calcined you pour distilled Vinegar, the Lead is indeed dissolved in the Vinegar, but the salt of the Vinegar unites its self to the Lead, so that if it be drawn off by distilling, it comes away quite without tast, the salt of the Vinegar remaining with the Lead, whence comes that same sweet mixt body which they cal *Saccharum Saturni*, or Sugar of Lead. So if Crabs-eyes, Corals, Pearls, be dissolved by Vinegar or other acid Liquors, and be reduced to pouder, so that they may be also strained through a paper, and the salt of those acid Liquors by reason of the similitude joyns it self with the bodies dissolved (so that if it be distilled it cannot be separated without much ado) yet if into the solution you drop Oyl of Tartar made by *Deliquium*, the salt of Tartar does by similitude unite it self to the salt of Vinegar, and the dissolved Pearl or Coral is precipitated to the Bottom. So if to Quick-silver you pour Oyl of Vitriol or Sulphur, the Quick-silver is dissolved in them, but the salt which is in those Spirits is united to the Quick-silver, whence arises Mercury precipitate, which hath therefore such a corrosive faculty. Of Quick-silver, Vitriol, Salt, is made *Mercurius sublimatus*. Of Mercury and Sulphur sublimed together, is made *Cinnabaris*. Thus Metals are reduced into pouder when being dissolved in corrosive Liquors they are precipitated to the bottom. Yet they return and are reduced into their former Nature, that Body or Salt being taken away which they borrowed from the Solvent, which Operation is called Reduction. Which may be performed divers waies. Mercury precipitate if it be rubbed in a Mortar with Oyl of Tartar or Salt of Tartar dissolved *per deliquium*, the Salt which cleaves to the Mercury is united to the Salt of Tartar, and forsakes the Mercury, whereupon it turns to Quick silver again. So, if Mercury sublimate be mixed with Quicklime, and put into a Retort, the Salt of Vitriol, and the common Salt which is in the sublimate, sticks to the live or unslak'd Lime, and so the Mercury returns to its former Nature, and becomes Quick-silver again. The Calces or Pouders of Metals are turned into molten Metals when the Salt mixed therewith is dissipated by a strong fire, yet it is done sooner if some of those Pouders they cal melting Pouders be mixed therewith. For the Salts of which those melting Pouders are made do draw to them the Salt which adheres to the calcined Metal; from which when they are freed, the Atomes of the Metal by reason of similitude unite themselves, and so return into their ancient

Precipitation.

Reduction.

Body

Body and shape. And indeed, how many external forms Bodies natural being mixed with others may put on (their substantial form remaining safe and sound) even Mercury alone may teach us, which puts on so many external forms, that it may be wel called Many-shap'd Mercury. 'Tis changed into a clear water, into a Liquor like Butter; 'tis sublimated, precipitated, reduced into pouder, into Glass, the likeness of Lead, Gold, Silver, so that it may be wrought into Plates, and I know not how many forms besides; al which nevertheless it laies down, if that which is mingled with it be therefrom separated. *Many-shap'd Mercury.*

This Doctrine also of Atomes is manifestly confirmed by anointings with Mercury and Fumigations made thereof; wherein the Quick-silver being reduced into smal Atomes penetrates the whol Body to the very jaws and mouth where it may be received by pieces of Gold held in the same. Yea, and it hath been found that after nointings with Mercury, Quick-silver hath been collected in the Cavities of the Veins and Bones.

Yea, There are Atomes not only of inanimate Bodies, but also of some animate bodies: and the Soul it self may sometimes lurk and preserve it self in such smal bodies; as we shal hereafter shew when we treat of the Spontaneous Original of living things; and upon this Doctrine of Atomes the most learned *Fortunius Licetus* hath built in a manner al his Treatise of the Spontaneous Original of live things. Of which we shal speak in its place. *Atomes of Animate Bodies.*

Plants (truly) do manifestly declare that there are Atomes. For who would beleeve that in cleer and transparent Wine there were a stony substance, unless it appeared by separation, whiles the Tartar separated from the Wine sticks to the sides of the Vessels? And matter unfit to nourish the body being thrust into the joynts stirs up arthritick pains, and there at length it grows into a kind of stoney substance. The Generation also of other diseases shews the same: For seeing many superfluous things unfit to nourish are taken in with our meat, they though they are bitter, and sowr, and salt, and otherwise pomaint, strong and different; yet (as *Hippocrates* saies, *de Prisca Medicina*) being mixed and mutually tempered together they are neither perceived, nor do they hurt a man: but when any of them is separated and by it self, then it becomes apparent, and troubles a Man. *The Atomes of Plants.*

Also the Atomes of Purging Medicaments do make the Milk purging, as also *Hippocrates* saies in 6. *Epidem. com.* 5. *text.* 33. If a woman or a she Goat eat Elaterium or the wild Cucumer, their yong ones are purged. For although as we have also said in our *tr. de Dissens. chymicor. cum Aristotelic. & Galen.* a purging Plant eaten by a shee Goat is digested in her stomach, and mingled with the Chyle, that Chyle is turned to Blood, that Blood in the Goats Dugs becomes Milk, this Milk is drunk by the Nurse, and there are so many mutations: yet in all these the Atomes of the purging Plants remain intire, and keep their Vertues. *The Atomes of purgatives*

Milk also it self, though it seem but one body, yet the Whey, Butter, and Cheese do shew being separated, that there were divers smal Bodies mingled together therein. So the Blood of Animals, although it seems to be one homogeneal Body, there are nevertheless therein not only divers parts which afford nourishment to different Members; but also if it be distilled, Volatile Salt which before did not shew it self sticks in great quantity to the Receiver. Which also happens if the Horns and Bones of Animals be distilled.

Yea, and the consideration of whol entire Animals may bring us to the knowledg of Atomes. *Aristotle* in the 5. *Histor. Animal. cap.* 3. writes that in old Wax and in Wood a certain Animal is bred (which is the least of al living things) called *Acari*. There are also a sort of Lice called *Sirones*, so smal that they cannot be seen but by a sharp sight, and in an augmenting Glass. Yet these are Animals, *ergo* they have an animal, motive, nutritive, and sensitive faculty in an Organical Body made up of very many Organs. They draw, concoct, assimilate their nourishment, and are moved. They have therefore animal Spirits, and natural, which are themselves also bodies; they have Organs wherein they are generated, and wherein they are contained. And al these again if we divide them into their first and smallest Atomes or bodies, how many thousand parts wil they make? and if the little Creature Acari, or a smal Louse, be divided into so many thousand parts, how very exceeding little must those parts be?

And although those Atomes be so exceeding smal; yet the essential forms of things remain in them entire, as was lately said, and experience it self does witness. For if Gold and Silver be melted together, the Atomes of the Gold and Silver are so mingled in their smallest parts, that no sense can discern the one from the other. Yet both of them do retain their forms entire. Which appears hereby in that if you put *Aqua fortis* upon the said *Atomes retain the forms of things.*

Mass, the Silver melts and turns into the Liquor, but the Gold remains in form of a Pouder. If the dissolved Silver be precipitate it settles to the bottom in form of a most delicate fine Pouder. Each of these Pouders molten by themselves do return into their former shapes of Gold and Silver. So if Quick-silver be sublimed, precipitated, turned to water, and undergo other changes, according to the various mixture of the Atomes whereinto it is resolved with other things; yet it alwaies retains its own essential form, is easily separated from the Bodies wherewith it is mixed, and returns into its old shape of running Quick-silver. Nor does this betide in Metals only, but also in Vegetables or Plants. For when distilled Waters and Spirits are made by Chymists, insensible Atomes arise out of the Plants, so that in the *Cucurbita* they cannot any waies be discerned; but when they joyn together in the Alembick, and turn to Liquor, they again shew themselves in their likeness, whiles one is Spirit of Wine, another of Juniper, &c. And if a Goat be nourished with certain purgative Herbs, and a Nurse drink the Milk of the Goat, it wil purge the Infant which sucks that Nurses Milk; as was said before out of *Hippocrat. 6. Epidem. com. 5. text. 33.*

That most learned Peripatetick *Jacobus Schegkius* acknowledged the truth of this thing, when in *Lib. 2. de Occult. Medic. facult. cap. 1.* he thus wrote, *The beating of a thing into a most fine pouder does not necessarily corrupt the substance thereof, seeing it is an accident of an accident for that which is continual to be divided into very smal bodies.* And a little after; *It does not follow that the substance is abolished, if a man shall say that Medicaments beaten into pouder are effectual in our bodies.*

Atomes are determinate. Howbeit, Atomes have their Laws from Nature, and doubtless the Atomes of Fire are more subtile than those of Earth, although we cannot discern so much. For so the case stands with Natural things that the forms consist not save in a certain quantity; and as they diffuse not themselves beyond their Natural bounds; so they cannot be conserved save in a certain quantity. This also *Franciscus Aguilonius* observed, who in the 5. B. of his Opticks, Propos. 8. declared this thing in the example of Light, when he wrote; Though there is not a smallest in quantity, yet Light hath a smallest in Nature, that is to say, so smal a Light that it cannot be smaller without perishing. After which manner there are also the smallest among Natural Bodies; which if they be any more divided they lose their form and essence. For as Bodies towards their natural subsistency do require some bulk of quantity, which is nothing but the measure of corporeal substance; even so Qualities also (unless they be in some degree of excellency) they perish of their own accord. And in Propos. 15. We affirm that Light cannot of its own strength and by it self exist solitarily in any degree whatsoever, but that there is a certain limit of smalness, beyond which we cannot proceed by dividing without the destruction thereof, which therefore we may not unfitly cal the *minimum naturale* of Light: but if it be joyned to a greater Light, although it be smal, nothing hinders but by help thereof it may be sustained, provided both together do at least attain to the *minimum naturale*, or smallest natural quantity of Light. Moreover, this imbecillity of subsisting is not proper to these Qualities alone, which admit the diversity of greater and lesser, but also common to al Bodies which vary their magnitude. For as these without some bulk, so they without some degree of excellency cannot free themselves from destruction. For being attenuated beyond their strength they fal to nothing and perish, no contrary thing destroying them, but only through defect of that measure, which being an indispensable Law of Nature, is requisite to the proper maintenance of each one. But what he saies of Qualities may be said much more of Forms from which the Qualities flow.

Things smallest in Nature.

Now those disputes against Atomes concerning the infinite division of that which is continued of indivisible Lines, are disputed not from Natural but Mathematical Principles. For the Question is not here (as was said before) Whether a thing continued be perpetually divisible Mathematically? but, Whether or no Nature in her Generation and resolution of Bodies does not stop at some smallest Bodies, than which there are not, nor can be any smaller.

CHAP.

Chap. 2. *Of Mixture.*

SInce the Doctrine of Mixture is exceeding neceſſary rightly to underſtand the Generation of al Natural Things, and the Foundation wel-neer of al Natural Philoſophy; it is worth our Labor duly to explain the ſame. Which that we may the better do, we are to know in the firſt place that the term *Mixture* hath ſundry acceptations. For (as *Thomas Eraſtus, Diſput.* 2. *Contra Paracelſ. part* 2. *p.* 195. writes) ſomtimes it ſignifies an Heap and Maſs of things blended together, as of Rye, Wheat, and other ſuch like things which keep their ſurface and Integrity. Somtimes it ſignifies the compoſition of two or three, or more Bodies, ſo confuſed together, that though each retain its own Nature, and they may be ſeparated again, yet one Body is made up of al. Such is *Crama*, which is made of Wine and Water mixed; which is not one in Form, but in continuation only. For although neither the Wine nor the Water be ſeparable by their bounds, yet they are both ſo contained under their Natural Form as Gold is in Silver, which may be ſeparated by *Aqua fortis*. Such a Body is Honey and Wine, Honey and Water, and infinite others compounded by Art. Thirdly, it is taken for a Body compounded of divers things, ſo that of all one thing is made, of a different Nature from al the Ingredients, and having a form quite different from their forms. And things ſo mixed are truly ſaid to be mixt bodies. The firſt manner (ſince therein no real mixture is made, but dry things are only blended together, which makes no difficulty in our minds) *Julius Cæſar Scaliger* omits, and propounds other three, *Exercitat.* 101. *Sect.* 1. There are (ſaith he) three Manners, Degrees, or Sorts of Mixture. The firſt is of thoſe things which after they are blended may again be ſeparated; as a mixture of water and wine. For *Pliny* reports they are ſeparated with Veſſels of Ivy as he had it from *Cato*; and we do it with a cloth. The other manner is as it happens in thoſe bodies natural which we cal imperfectly mixed, of which there are two degrees: The other more weak, as of a Cloud, Rain, Wind, Hail, Snow, Dew, Hoar-froaſt, and ſuch like. For they are exhalations mixt of divers Elements which may eaſily be diſſolved. But they hang together more cloſely than thoſe of the firſt ſort. The other degree is of a firmer union; as in clods of Earth and ſtones. For the parts of theſe are not eaſily ſeparated one from another. Yet they cal them rather mixt Bodies than by any other nobler Appellation, becauſe they ſeem to them to be things only begun. The third Mixture is of ſuch things as ſome are pleaſed after a peculiar manner to term Mixt Bodies. Such are Vegetable and Senſitive things.

Mixture, what it ſignifies.

Now concerning theſe three Manners, the Queſtion is, Whether they are in al mixt bodies made after one and the ſame manner. Which that we may rightly unfold we muſt know in the firſt place what Mixture is. Now *Ariſtotle* defines it to be the Union of things mixable after they are altered. And *Scaliger* in the place fore-alleadged; That it is the motion of Atomes or ſmalleſt Particles of Bodies to a mutual Contact, ſo as they may become one. And he further explains his meaning, and that rightly, how that every thing that is, is one, not only by continuation and privation of pure contiguity, but by act alſo, by vertue whereof it comes to paſs that thoſe parts become one body. Now by Act he means the Form, by which it comes to paſs that thoſe parts which by their own nature and aptitude might come together to an Union, are become actually one. And he concludes rightly, That thoſe things which are not one Beeing formally, but by accident only (as an Heap of Beans and Oats blended is one) are not properly mixt bodies, nor ought ſo to be called, but things jumbled, as Wine and Water, Silver and Gold; ſince ſuch things are not formally one, but ſo many things as there are parts within and without, and only one by accident; which though it be leſs manifeſt to the ſenſes, yet is it not hid to the underſtanding of wiſe Men; ſeeing they may eaſily be ſeparated, as Wine and Water by Ivy Veſſels, and by cloaths; and Silver and Gold by *Aqua fortis* ſo called.

What mixture is.

But by al that hath been ſaid the difficulty is not quite removed, nor the Nature of Mixture ſufficiently explained; but two knots do remain as yet to be untied, which being rightly unfolded they bring great Light to Natural Philoſophy and Phyſick. For although we muſt needs grant, that nothing is truly mixed but what is formally one; yet the queſtion ſtill remains: Firſt, Whether it be neceſſary that the mixable bodies which are united by vertue of one Form, and grow together into one mixed Body, ſhould loſe their own Forms? or, Whether in the mixed body they may al under another form retain their own forms ſtil? Secondly, Whether the Elements only are mixable, and every reſolution into the ſmalleſt

particles made in reference to Mixture does alwaies proceed so far as to the Elements? or whether other bodies more noble than the Elements may properly be said to be mixed? Both which Questions must be explained.

Whether things mixable do in the mixture retain their forms?

As to the first Question, That the same may be rightly explained, we wil only enquire concerning the Elements. For concerning them there is no doubt but that they are rightly mixed; but as touching other Bodies the matter is questionable. But whatsoever shal be said of the Elements, that hath also undoubtedly place in al other mixable bodies. Now there are chiefly two Opinions concerning Mixture; the one held by well-nigh al the Ancients before *Aristotle*, as *Empedocles*, *Democritus*, *Anaxagoras*, *Hippocrates*, yea, and by very many Philosophers since *Aristotle*, who al held that Generation and Corruption are made by the Conjunction and Separation of Atomes, and that the Bodies mixed do retain their forms entire in the thing made up of them. Which manifestly appears out of *Hippocrates*, *Lib.* 1. *de Victus ratione*, where he writes: *What I mean by Generation and Corruption I must explain for the sakes of many, viz. To be mixed and separated. Now thus the matter stands: To be generated, and to be mingled are all one, and to be separated and corrupted are all one.* According to whose mind, as I said before, *Jul. Cæsar Scaliger*, *Exercit.* 101. defines Mixtion; That it is the motion of Atomes to the mutual contact one of another, that they may be united. The other is the Definition of *Aristotle*. For he only separated from the Ancients in this point. For thus in the 1. *de Gener. & cor. cap.* 10. he writes against *Empedocles*: *We must not say, That such things as are mixed are mingled by their smal parts, which still retain their own nature. For that would be a composition, but not a temperature or mixture, nor would the part be of the same nature with the whol. We say, That if a thing be mixt the parts thereof are one like another, even as every part of water is water. But if mixture be a composition according to the smal parts, none of these things does happen, but that is only a mixture so appearing to the sense, and that which a dim-sighted man will account mixed, a quick sighted man will discern not to be mixed.* He teaches the same in the 2. *de generat. & corrupt. cap.* 7. *pag.* 47. the sense of which place *Toletus* thus propounds: *He reproves this manner of mixture* (which *Empedocles* supposed) *because one inconvenience follows*, viz. *That out of every part of the mixt body the four Elements could not be extracted, and so every part of the mixt body is not mixed: the Consequence is cleared, because as out of every part of a wall cannot be taken stones and bricks, because where the one is, the other is not: so truly it will be in a mixt body, which is made after the same manner of the Elements.* And thus indeed *Aristotle* opposes the Opinion of the Ancients; but he so propounded his own Opinion that hitherto for so many Ages there hath been Civil War amongst his Expositors, what his Opinion was, or how it is to be explained; whiles some (as *Averrhoes*) do hold that as wel the substantial Forms as the Qualities of the Elements do remain actually in the body mixed, only broken, allaied, and reduced to a mediocrity. Others (as *Scotus*) do teach that the forms and qualities of the Elements do quite perish in the mixture, and that a new form of the mixt body is generated, and a new quality, which is the temperature of the mixt body. Others (as most of the Latins) do conceive, That the forms of the Elements are no waies preserved in the mixt body, neither entire nor broken, yet they hold the Qualities remain in the mixt body, but broken and reduced to a mediocrity. Whose contentions to set down in this place is no part of my business. They may be read in *Zabarella* his Book of Mixture, in *Tolet. Lib.* 1. *de generat. et corrupt. cap.* 10. and other Expositors of *Aristotle* every where.

The Opinion of those Authors who hold the Forms remain in the mixt Bodies.

There have been found in the mean while most learned men of no smal note, who being moved with the evidence of the thing it self, have embraced the Opinion of the Ancients, as *Philoponus*, *Albertus*, *Aureolus*, *Zimara*; and amongst Physitians *Avicenna*, *Fernelius*, and very many more, who so stoutly defend the Opinion of the Ancients that some of them write, Whoever read their Arguments (if he be not a Mil-stone) wil consent, and those that think otherwise play the Sophisters, abuse the Works of Nature, and destroy and defile the Splendor of the Ancient Discipline. And especially *Avicenna* comes up directly to the mind of the Ancients, and holds, That the Elements in mixt Bodies do retain their Forms perfect and entire, howbeit divided and cut into very smal parts, so that their particles composed and knit together in a certain order do mutually cohere one with another. *Fernelius* follows *Avicenna*, who *Lib.* 2. *Physiolog. cap.* 6. cals the Opinion of those that hold the contrary, a childish and vain, nay, a monstrous Opinion; and he judges that those who so think have contemned the Philosophy of the Ancients. And they do indeed al of them wel, in that they adhere firmly to the Opinion of the Ancients, being moved thereto by most firm Reasons: but herein they take pains to no purpose, whiles they would make

this

this to have been the Opinion of *Aristotle*; since *Aristotle* in expres's words relinquishes the Ancients in their Opinion, as appears in that place lately alleadged. Yea, and very many others who differ from the Ancients saw this Truth, and nothing but the Authority of *Aristotle* hindred them from imbracing the same; and if the Authority of *Aristotle* be set aside, and the point debated only by reason, and no vain labor bestowed how to reconcile this Doctrine with *Aristotle*'s words, that is, Truth with Falshood, the case is very plain. Yea, *Aristotle* himself comes to this Opinion against his wil, whiles at the end of his 1. Book *de Ortu & Interitu*, he defines Mixture to be the Union of things mixable, being altered. For when he saies the Union of things altered, he intimates that the things mixed do not perish, but remain in the body mixed. For if they are altered and mixed they do not perish. Nor does the word Union oppose this Opinion, as *Zabarella* conceits in *cap.* 1. *de Mist.* but rather confirms the same. For Union is the Copulation of such things as have a real Being, but not of things that perish. And although of many things one be made: yet neither is it necessary that those simples should perish, nor is it a meer aggregation or blending, but the simples by a superior form are reduced into one body. And this Doctrine of the Ancients, viz. That the Elements and simple Bodies do keep their natures entire in the Compounds, is the key (in a manner) to al Natural Philosophy, and the greatest part of Chymistry and Physick.

Contrariwise, That only Opinion of *Aristotle*, That the Simples do not retain their Natures in mixt Bodies, hath cast the Expositors of *Aristotle* into Labyrinths and inextricable Controversies, and hath been brought into Natural Philosophy to the great dammage of Physick; which being rejected all things become plain and easie.

The ancient Philosophers, and late Authors which follow them, have been induced to imbrace this Opinion by very strong reasons. For first of al, the Nature of Mixture shews as much, since things that perish cannot be said to be mixed: which *Aristotle* himself in the end of *Lib.* 1. *de Ortu & Interitu* acknowledges. Nor could he do otherwise. For since (as in *Metaph. Lib.* 5. *text.* 3.) he declares, That Elements are that of which existing things consist; it must needs be that these Elements (if they were Elements) must abide and exist in the mixt Body. *Arguments for this Opinion.*

Moreover, Since Action presupposes Act, and in mixt bodies the actions of the Elements are apparent; of necessity they must be actually in them. Not to speak of others, *Aristotle* himself, *Lib.* 1. *de Cælo*, writes, That a mixt Body is moved according to the sway of the prevailing Element.

Finally, The Resolution of mixt Bodies into their Elements shews the same. For mixt bodies are resolved into the Elements; and *Aristotle* himself in 1. *de generat. & corrup. text.* 84. saies, That the things mixable may be separated again from the mixt body. And if so, then were they actually in the mixed body.

The force of which Argument is such, That those who have labored to answer the same, have shamefully foiled themselves. For the Conimbricensian Collegiates, while they deny that while Woods are burnt they are resolved into the four Elements, and deny that the water which drops out of the said wood, and distilled waters, are true water, they resist not only *Aristotle* himself, and other Peripatericks, but also their very Senses. For suppose that Liquor which drops out of burning Wood, or from an Alembick, is not pure water: yet our Senses, and the separation which is easily made, do witness that the greatest part thereof is water. And after this reckoning there should be no Element of Water in the whol World; since it is no where found pure. But others left they should go against their own Senses, do indeed grant that mixt bodies are resolved into the Elements, but they foolishly hold, that not the same Elements in number, but only the same sort of Elements come out of the mixt body; which is founded upon no reason, but is only hatched to palliate an absurd Opinion, yea, and it is repugnant to Reason and Experience. For when they hold that Elements return out of the mixt body by reason of the action of a like Element, whereby they recover what they lost in the mixture; how I pray you, in distillations and burnings can Water and Earth be extracted out of the Compound? since Fire by acting upon the mixt body introduces nothing that is watry or earthy, yea, the action of fire is adverse to water and earth, so far is it from augmenting or perfecting the same. The only agent in combustions is fire: and the force thereof equally affects al the parts of the mixt body, and yet nevertheless it brings out some hot, others cold, others moist, others dry, others bitter, others sweet, others other waies differing: which since they cannot proceed from one only action of fire, verily we must believe they were before in the mixt body.

And

And which way soever they turn themselves who hold the contrary Opinion, yet they can no waies dis-intangle themselves. For either the Form remains in the mixt body, or it does not remain. If it remain, it remains either entire, or broken.

He who holds they remain intire, consents with the Ancients. But *Averrhoes* and *Zabarella* hold they remain broken. But what they bring concerning the Refraction or breaking of the Forms, is a meer figment; and their Opinion who hold the forms of the Elements are capable of more or less are sufficiently refuted from the Latins disputing against the Opinion of *Averrhoes*; nor have they ever brought any so much as a probable reason for their Opinion, but have only simply and barely affirmed, that Forms have certain degrees, some of which may be taken away, and the rest remain. For the whol Nature of the Form consists in that which cannot be divided, nor does any Form receive more or less, but where ever it is, either it is totally there, or not at al.

But they which hold the Forms do not remain in the Body mixed, and that nothing remains but the matter, are very absurd and almost ridiculous. For what mixture is there where nothing remains? For since the Elements have no other matter than the first, and the first matter is common to al the Elements, I cannot say that one mixt body hath more fire than air. For whatsoever is, is by its form. And therefore if the Elements are not in the mixt body by their form, they are not there at al. And thus a mixt Body in respect of the Elements should be as simple as the Elements themselves; because although the matter be from the four Elements; yet because the Matter of Fire, Air, Water, Earth, does not differ, and the Form (according to their Opinion) of Fire, Air, Water, Earth, should be no longer present, the mixt body so called must needs be simple.

And that we may also consider what is wont to be objected to the contrary; if any shal ask, What were the Motives which caused *Aristotle* to forsake the Opinion of the Ancients commonly held in his time, we cannot find any of moment, save that which he chiefly propounds, in 1. *de Generat. & Corrupt. cap.* 7. and that is this: That he conceives from the Opinion of the Ancients this absurdity follows, That every part of a mixt body should not be mixed, and that out of every part of a mixt body the four Elements could not be extracted. But the Ancients wil answer, That this ought not to be done, and that this is *Aristotle's* Hypothesis, and that he laies that as a Foundation which is the matter in Controversie. For this Assertion seems contrary to the nature of mixture. For if there be a mixture, those things which are mingled must needs be simples. Nor is it necessary that those Simples should be mixed, but at last in the resolution we must of necessity come to Simples.

Others also do ad other Reasons. *Scaliger*, *Exercit.* 16. *Sect.* 3. The Forms remaining (saies he) mixture (according to *Aristotle*) should be but an heap; as it is in dry bodies. For the Natural Quantity of every smal part follows the existence thereof, but not continuation, for so should they be really the Atomes of *Democritus*. But *Scaliger* whiles he regards somtimes truth, other whiles Authority, contradicts himself, and answers this Argument, *Exercit.* 101. while he writes; That these parts retain their forms, but lose the prescription of their bounds, and so they are not a meer heap, but do make a mixt body. For that is false which some object, That things of different sorts cannot be continued. For whiles the Elements are united under the Dominion of one Form, they are really continued. Nor is it absurd (as the same *Scaliger* writes in the same place) to hold that there are many forms in one continued body. For these forms are every one the act of its own Matter. Which matters because they are by Nature ordained to a more labored composition, she hath provided that their forms as wel as themselves should be mixed. But the ultimate and most excellent forms, as of a man, since they are not ordained for any further work, they only are not mixed.

Moreover, Neither is this of any great moment which some object; If the Elements should remain perfect under the dominion of another Form, it would follow that the Form of the mixt Body should be an accident; since what is added to a perfect Being actually constituted is an accident. For the answer is manifest from what hath been answered to the former Objection. For as *Scaliger* saies there, those less noble Elements and Mixables are made for the sake of the more noble, and therefore submit themselves to the Rule of the more noble form, which supervening obtains the Office, not of an accident, but of a specifick Form. But those things only which are added to those more noble bodies, which are not ordained for any further composition, are accidents.

The principal cause of mixture. Now that many have not been able to attain the truth in this point, and have erred in a matter plain enough, the chief cause is, That they knew not the true and principal Cause of mixture,

mixture, and thought that al sorts of Natural Bodies did proceed only from the mutual fight of the Elements, and their mutual action one upon another; and to use the words of *Aristotle* himself, *Lib. 2. de Generat. & Corrupt. Cap. 9. text. 54.* they attributed powers and vertues to Bodies (by which they generate most instrumentally) neglecting the cause taken from the Form. But the sole concourse of Elements makes very few sorts of natural things, and none of those more perfect Bodies: and contrary to the mind of *Aristotle*, the Expositors father upon him, that he brings the Generation of Natural Bodies only from the Elements. For he expresly holds (as was said before, *2. de generat. & corrupt. text. 40. 53. & sequent.*) that the Qualities of the Elements are only Instruments, and the principal Cause is the specifick form of every thing. The same thing *Scaliger* teaches, *Exercit. 307. Sect. 20.* Unless (saies he) the four Elements have a Governor, they wil vainly tos and be tossed. For what is it that shal mix so much Earth with the rest? And there ought to be in every motion one first Mover. For they cannot move themselves to any work, but in Compounds they are moved to mutual connexion by a more excellent Form, in bodies imperfectly mixed by an external principle. *Erastus* was forced to acknowledg the same, who although in his Disputations against *Paracelsus* he writes, *Parte altera, pag. 196.* that there are no qualities in the whol world which can change whol Bodies applied to them, besides heat and cold, moisture and driness (and that therefore these Qualities must necessarily be held the Principle of Mixtures) yet compelled by the evidence of the thing it self he ads by and by: we do not say that they are principles in such a sense, as if we held them to be the principal Causes, but we say they are Instruments without which no form can make a mixture. But being further demanded, What that form is which is the worker of mixtures? he answers, It is the Divine Command whereby in the Creation God commanded the Elements that they should orderly meet together for the Generation of things; and that the Motion of the Heavens gives no smal assistance thereto. But this answer is partly from the purpose, partly false. For the Question is not about the first Cause of things, but the immediate Cause. Nor is it yet proved that God gave this Command to the Elements, but it is the Office of the Form to marshal the Elements in a mixt body. And although God created al things, and these lower Bodies are subject to the motions and influx of the Heavens; yet God hath given Nature, by which al things are generated, which is the form of every thing, and the Soul of things animate. It shapes it self its own body, and for the making thereof draws Elements and other Bodies, disposes, unites and governs them; whence it follows that they are now formally one, and being united under that which is actually one they become themselves actually one which before were many. And therefore the Elements do not concur of themselves, but are drawn by the Forms. Whereof *Scaliger* writes excellently in *1. de Plantis*: *The Soul* (saies he) *is Nature to a living thing. She shapes for her self Hoofs, Teeth, Horns to defend life: and therefore she uses them, and knows how to use them, without any object or any phantasie. He that made the Soul gave certain precepts thereto, partly general, partly special. Those are such as pertain to her preserving her union with the Body: of which there was to be no outward Author. Careful therefore hereof she moves the Heart, concocts in the Stomach, concocts again in the Liver, perfects the nourishment in the Veins, digests in the Members, changes it into the substance of the Body, bears it, unites it, restores it, repairs it.* Yea, he speaks Divinely in his *2. de Plantis*: *That* (saies he) *which is heavy, also ascends: For that work is performed by the distributing faculty, which also lifts the Earth upwards, and drives or draws the air downwards; being Lady of the Fire and Air, by the first Command of its Creator. For I doubt not but you hold that there was not one Spirit-maker of all things, and another the Preserver of them when made; nor that he which made all things of himself, and cannot be absent from himself, can be absent from the things he hath made. God, God, my good friends, neither idle, nor busied, neither in work nor out of work; but without work, the Head, Beginning, Middle, End, and all of the Work, and that I may in one word dispatch, compass in, and surmount all, He himself, who by his most simple and indivisible Understanding of himself made the World; wherein all have attained their End and Order.*

The Opinion of Erastus touching the Cause of Mixture.

Mixture how it is made.

Nature the Handmaid of God.

All things from God.

Zabarella also saw the same Truth in part; but he could not reach the whol, being hindred by a pre-conceived Opinion, whiles in his *1. de mist. Generat. & Interitu, cap. 2.* he distinguishes betwixt the generation of a mixt animated body and an inanimate, and saies rightly, That a living Creature is not generated by the Elementary Vertue, but by Vital Heat implanted in the seed, so that in the generation of a living thing al the Qualities of the Elements are instead of matter, and the immediate Agent is the Vital Heat implanted in the Seed, being proportionable to the Element of the Stars.

The Generation of a living and lifeless mixt Body does differ.

But

But whereas he saies that a mixt Body as such is generated by Elementary heat tempered by cold as the prime Worker, working upon the two passive Qualities as Matter; that is liable to many difficulties. I say rather, hardly any perfectly mixt body is generated after that manner as *Zabarella* supposes, and that there is no such mixt thing in Nature. For what (as was lately alleadged out of *Scaliger*, *Exercitat.* 307. *Sect.* 20.) should thus collect certain portions of Elements, and what should mingle so much Earth with so much Water? Nor is there any reason to fly to the fire in this case, whereof *Scaliger* speaks in his second *de Plantis*: If the Fire unites the three other Elements as parts, what shal unite it to the three? But most likely it is, that al perfectly mixt things are either parts of an animated Body, or sorts of Natural bodies made in the first Creation, which either yet remain such in the Individuals, or are continued by a new Generation; whereof *Scaliger* most rightly in the same Exercitat. saies, That every Form of every perfectly mixt body, although it be not a Soul, as that of an Adamant, is a fift Essence far different from the four Elements. For this form in Gold, Silver, and other Metals, in Jewels and Stones, aptly disposes the Elements and such matter as is fit for it self. From which it easily appears, that what is by *Zabarella* objected, *de Mistione*, *cap.* 9. is of no moment; where he writes, If in Mixture there were made a resolution into the smalleſt parts natural, there must alwaies be equal portions of the mixable Ingredients, or they must hold the same proportion one to another. For this is no waies necessary; but the Elements concur in an unequal and most divers proportion, according as the Constitution of the mixt body requires, or as the mixture is directed by the superior Form. For a Gourd and a Cowcumber draw more Water and less Fire; and a Pitch-Tree, a Pine-Tree, and a Fir, draw more Fire and less Water.

whether a fight of the Elements is requisite in Mixture?

Moreover, This also was no smal Cause (which yet agrees almost with the former) why many erred from the Truth, because they supposed that the Elements did no otherwise concur to Mixture than by their fighting one with another. For seeing mixt bodies consist of contraries, and contraries do mutually fly one another; that they may concur and friendly agree to make up a mixt body, some have thought that this friendship and agreement could not be procured unless by fight foregoing they were reduced to a mediocrity. Which agreement of the Elements how it should be made they are at variance amongst themselves, whiles some hold that it is sufficient that their first qualities be abated, though the forms remain intire; others conceiving that both the forms and the qualities were remitted and broken. But there is simply no need of this fight; it is sufficient if they be reduced into Atomes. For then it is that things contrary do fight together and shun one another, when notable magnitudes and portions of them do concur. But when they are reduced into their smalleſt Particles or Atomes, there is either none at al, or no considerable Skirmish. Which thing is apparent by many experiments. When water is poured upon burning coals, a noise is raised by the fight of those Contraries; but not when the fiery Atomes are mingled with the Water, while the Water heats and is turned into vapors; where by the confession of al men the Atomes both of Water and Fire are contained in the Vapors, and keep the peace. So also, if water be gently heated, it receives the fiery Atomes without any fighting: but if the water grow exceeding hot, and the fiery Atomes come thronging into the Water, or particles of fire bigger than atomes, there is fighting, and great bubbling and boyling. But when the water is resolved into vapors and smalleſt atomes, although it be joyned with atomes of fire, yet no fight is observed. Oyl admits no Water, nor is mixed therewith, by reason of the contrariety of its Nature. Yet if Oyl be reduced into Atomes it wil admit Water. For examples sake, distilled Oyls do swim upon Wine and distilled Waters, and mix not therewith; but if those Oyls be first mixed with Sugar, and the Sugar afterwards dissolved in Wine or Water, the Water receives the Oyl being reduced into smal atomes, and thereby a Medicinal Wine or Water is made, having the smel, tast, and vertues of the said Oyl. After the same manner in the dissolving of Pearls, Corals, Metals, first there arises a bubbling and a noise, the bubbles ascend; but when the Connexion of these Bodies is loosened, and they are divided into Atomes, al is quiet, nor do they act any more one upon another, although each of these bodies remains under its own form, as Precipitation and reduction teaches. So also in the preparation of *Tartarum Vitriolatum*, if Spirit of Vitriol be mingled with Oyl or Salt of Tartar, there arises a mighty battle, a noise, hear, and boyling. But when these two Fighters are duly mixed in their smalleſt parts, al the Quarrel ceases, nor is there any more noise or boyling. Nor let any man object, That those smalleſt Atomes therefore fight not, because they are by their mutual action one upon another tempered and reduced to moderation. For separation and reduction do shew the contrary,

which

which teach us, that those smallest Atomes do remain and subsist under their own proper Form, and are easily (being joyned together) reduced into their ancient body again. So the Spirit of Vitriol and Salt of Tartar do in their very mixture retain their Forms entire; which even distillation shews, by means whereof the Spirit of Vitriol is again separated from the Salt of Tartar, and being separated it subsists of it self with al its forces entire. Which if it be again poured upon the Salt of Tartar it raises a new combate, until these Combatants (being mingled in their smallest parts) come to a Friendly Agreement.

Whether in mixture the Ingredients must needs be reduced into Atomes?

From al which it appears, That although contrary Principles do concur in the Generation and Nutrition of mixed Bodies; yet for their uniting there is no prime necessity of a fight, but it suffices that they concur in their smallest Atomes. And this is that which *Hippocrates* writes in *Lib. de Prisca Medicina*: In a Man there are bitter, and salt, and sweet, and sowr, and harsh, and tastless parts, and an hundred other sorts, which being mingled and mutually tempered together are neither discerned, nor do they trouble a man; that is to say, when they are reduced to their smallest Atomes, and so mingled together. But when they exist apart, that is, when many Atomes of the same kind being separated from the rest are joyned together, so that they become a conspicuous coagulated Body, then they exercise their Activity. And hereunto tend all the Digestions and Fermentations of the Chymists, viz. That Bodies which in a greater bulk were contraries may be reduced into their smallest Atomes, and afterward agree friendly together and be united.

The Eduction of Forms is rejected.

Finally, It hath been also no smal Cause of Error in many, that same vain Fiction of the Eduction of Forms, which we have elsewhere rejected. For although herein (as was said before) *Zabarella* is in the right, when he holds that the Vital Heat is the Agent in the Generation of living things (though it be not the primary Agent which is the form, but its Instrument) yet ever and anon he fals back into the common Opinion, and endeavors to reduce the Generation of living things also unto the Concourse and simple mixture of the Elements. For so (*Lib.* 1. *de Misti Generat. & Interitu, cap.* 3.) he writes, When five degrees of Heat, and six of Moisture concur, it is a convenient proportion for to educe the form of Oyl. Whereas sure it is, That Oyl is not generated by a simple concourse of Elements, but is produced by the Olive Tree. Now Olives are the Fruit of the Olive Tree, which the said Tree produces by its inbred Heat; out of them is pressed the Oyl after the same manner as out of Almonds, Nutmegs, Lin-seed, Poppy-seed, and Wine out of Grapes.

Whether the Elements only are mixed.

As to that other Question, Whether the Elements alone are mixed? or whether there are other smal Bodies or Atomes which may truly be mixed? The most (truly) of *Aristotle's* Expositors do conclude also from that supposition of theirs whereby they hold, That al things are made by the mutual action of the Elements one upon another; that only the Elements also are mixed, and that there is no mixture in which there is not a resolution as far as to the Elements. But he that shal diligently consider what is dayly done in Nature, will observe that this is not alwaies necessary. The case (truly) is plain in those less perfect Mixtures; since Natural Bodies do retain their perfect Forms in them, as is cleer in Metals dissolved in *Aqua fortis*. Nor yet is it necessary in perfect Mistion. And I conceive that it is manifest in Plants and Animals. For neither are they nourished with pure Elements, but with other mixt bodies created for their sakes. A man is nourished with blood, and in that Nutrition which is a true Mixture and substantial mutation blood is not first turned into Elements, that of them flesh may be made, bones, &c. Blood is made of Chyle, Chyle of the meats we eat. In which mutations there is no resolution into Elements, but as the next matter of a Bone, Flesh, &c. is blood: so the matter of Blood is Chyle; the matter of Chyle is Bread, &c. And there are many Documents of this matter. For if in the stomach meat and drink were resolved into the Elements, no Form or Quality of things which are used in meat would remain; whereas nevertheless meats which have a purging faculty may turn to blood, and so to Milk having the like purging Faculty, which qualities could not remain in the simple Elements, if meats were resolved into them. And many Diseases arising from the use of naughty meats do more than sufficiently declare that there is no resolution as far as to the Elements in the corruption of Meat and generation of Nutriment. For al the more ignoble mixt bodies are matter for the more noble. Thus *Hippocrates* writes of Plants: Such things as grow out of the Earth and are sown in the Earth, when they come into the ground every one draws that which in the Earth is most suitable to its own nature. Now there is in the Earth both tart, and bitter, and sweet, and salt, and such like. First therefore it draws much thereout which is accommodate to its nature, and then also it draws other parts.

Most renowned Philosophers and Physitians content with *Hippocrates* Not to speak now of others, *Thomas Erastus* in *defens. thes. de saporibus* writes; Al Medicaments in a manner do not consist primarily of the Elements, but are compounded of things formerly mixed, and that many times. *Galen* shews that the body of Man is compounded, not of the four Elements, but of the four Humors, as the immediate matter of its Generation. Now it is again apparent that these Humors are made of the Meat and Drink, which are also themselves evidently made of the Juyces of the Earth. For Animals are nourished by Plants, Plants draw out of the Earth juyce familiar to them, as bitter, sweet, sowr, because of them the Nature of each properly exists. The Seeds (truly) sown in the ground while they draw to themselves profitable and convenient Nutriment they draw only such juyce as is compounded of the Elements.

And therefore those bodies also of which these are made, although they are termed the smallest bodies, yet are they not absolutely such, but the smallest of their kind, that is, such as to which those bodies when they are resolved do return, and consequently not into Elements, but into those things of which they immediately consist. Milk turns into Butter, Whey, and Cheese. So the same heat acting upon the homogeneal meat changes it into divers humors, according as it is disposed, nor does it of any Particle form every thing. Wine I conceive is rightly held to be not a thing blended and jumbled, but a perfectly mixt Body intused. But if it be put in a Stil and stilled, little Spirit that wil burn is drawn forth, much Water remains and a little Earth; because there is more Water than either Fire or Earth in Wine; which yet would not so come to pass if out of every smallest Particle, Fire, Air, and Water might be drawn.

Into what mixt bodies are resolved.

For indeed, as hardly any mixt body is composed immediately of the Elements; so also mixt bodies are rarely resolved into the Elements. Which is apparent by the corruption and resolution of things, both violent by fire and burning, and natural. That Plants and Animals when they are dead and putrifie are not resolved quite into the Elements, that smel and stink does sufficiently evince which belongs to no Element but is proper to mixt bodies. And as of things living some have one smel, and some another: so also is it with Plants and dead Carkasses. Yea, and the pestilence hath been frequently observed to arise from the putrefying Carkasses of dead Animals. The same happens in violent Resolutions which are made by Chymical Distillations and Sublimations. *Zabarella* indeed *Lib. 2. de Mistor. Generat. & Interitu, cap. 2.* writes, That Cumbustion is the mutation of a mixt body into one Element only, namely Fire, some part of Earth excepted. Also many others do imagine, that if they see a fume or vapor ascend out of any thing, that the said thing is resolved into the Elements. But the matter goes far otherwise; for the fire retains its own, and gives to others that which is theirs. Fire is used in Chymical Distillations and Sublimations, somtimes gentler, other whiles stronger; yet neither of them resolves things into the Elements. For although fumes and vapors ascend; yet if they be received in Alembicks and Receivers, it is apparent that the resolution is made only into Atomes of a peculiar kind; and some flowers are gathered of Mercury, others of Sulphur, others of Sal Ammoniack. So in Distillations although one kind of vapor seem to arise; yet if it be collected in an Alembick, it appears to be Spirit of Wine, or Cherries, or Juniper, *Aqua fortis*, or some other Compound. Yea, although they may ascend insensibly, so as not to be discerned by the eyes, so as to pass through a thick paper four times doubled: yet are they not changed into Air, but into a spirit of its own kind. Yea, if Sulphur, or Pitch-wood, or Pitch be set on fire, they turn not into Elements, but their proper Oyls are gathered therefrom.

And from what hath been hitherto said, it is apparent that the primary efficient Cause of that mixture in Plants and Animals, yea, and al perfectly mixt bodies, as Stones, Jewels, Minerals, and Metals, to constitute their Bodies, is that same specifick form of a natural body, which draws matter fit for it self, and disposes the same after a certain manner.

Some Mistions are made by consent & dissent of Atomes.

But al other Mixtures which are not directed by a superior form, by what names soever called, proceed from the Content and Dissent of Atomes, by means of which like are moved to like and like are assimilated to like. For although this likeness and unlikeness of Bodies of a kind does not a little help towards the more convenient mixture which is made in Animals, and is governed by a more noble Form (as we see like meats are more easily digested than unlike) yet this mixture hath place chiefly in fermentations, either natural or artificial, and in the preparations of Medicaments, as also in those which are called recruitous. And this similitude of the smallest Atomes of a kind as it is the foundation of many mixtures, so is it of al Solutions. After this manner the fermentation of Wine, Beer, and al

Juyces

Juyces is made, viz. whiles such as are of the same Nature are united, and expel things different from them, and drive them out as dregs; which is chiefly effected by help of that same inbred Spirit which penetrates into al parts; which also we see betide in the fermentation or Leavening of Bread.

Whether Wines, medicaments, Treacle, Mithridate, and distilled waters, are bodies really mixed.

What we should think of white and red Wine mingled of Honey and Wine, of Medicinal Wines, Treacle, Mithridate, distilled and compounded Waters, and such like, whether they are true mixtures, or only things blended together, is a question amongst Authors. Some hold they are but things jumbled together. So *Thomas Erastus*, *Disput.* 2. *contra Paracels. page* 212. saies, white and red Wine mingled is but a jumbled thing, and adds this reason, Because our Taste tels us, that the taste of either of them stil remains, and that neither Wine hath lost its own nature, and it cannot be the redness should possess any but its own proper subject. And concerning Treacle *Zabarella* writes, *de Mist. cap.* 13. That Treacle hath no true mixture, or if it hath, that it is the mixture of the Elements, and not of the Ingredients of the Treacle. But these Opinions are founded upon a supposition not yet granted, viz. That nothing is mixed but the Elements, which we have before proved to be false. And therefore if otherwise it is sufficient to the Constitution of Natural Bodies that smallest Atomes of several kinds should meet and be united; of which because somtimes these, otherwhiles those are in greatest quantity, therefore the taste, smel, color, and other qualities somtimes of these, otherwhiles of those do abound, as otherwise in the mixture of Elements, the Qualities of the predominant Element do excel the rest: verily I shal not deny, when such bodies are first blended, they may be termed things jumbled, but when after Fermentation, or frequently repeated distillations, they are united in their smallest Particles, I see no cause why they may not be called bodies truly mixed. And if that cause were sufficient which *Erastus* brings to prove that white and red Wine blended are no truly mixt Body, most Wines should not be true mixtures; since most Wines are made of several sorts of Grapes, and therefore somtimes they taste like one sort of Wine, otherwhiles like another.

THE FOURTH DISCOURSE.

Of the Generation of Live Things.

Chap. 1. *Whether Souls are made?*

SInce Plants and Animals do not last in their Individual or particular Beeings, but some die, and others spring up in their place, and so the kinds and sorts are preserved to the end of the World, and as long as it pleases God the the Creator: it is altogether worth our Enquiry how this Generation of Living things, and the preservation of their kinds by individuals continually succeeding one another, is brought to pass; especially since renowned Men have been carefully busied, and in doubt also concerning this matter. Now al living things consist of Soul and Body. Whence they have their Body is cleer enough; but whence they have their Souls is not so evident. We are therefore now resolved to make that our Enquiry. Which whiles we do, we shal consider the matter it self, and not contend only with Authorities, nor shal we bring our selves into a Labyrinth and Maze, wherein many wander about and can never get out, whiles one while they follow Reason, another while Authority, and make it their business, alwaies to save the Authority of great Authors, and so vainly labor (oftentimes) to reconcile Truth and a Lye together.

The essential parts of living things.

And although there are divers sorts of Living things; yet since al of them have life from the Soul, we shal speak in general whence living things receive their Souls, and whence Souls have their Original.

In the first place, Some do here briefly quit themselves, and deny that forms (such as the Soul is) are made. For thus saies *Toletus*, Lib. 1. *Phys. cap. 9. qu. 19. We wholly deny with* Aristotle, *that Forms are made or produced; but Compounds are made, not out of nothing, but of matter; but the Forms are consequently made and comproduced: whence they are not created, because Creation is an action whereby a thing is first made; but the Forms are not first made. And this is the power granted to Natural Agents, that they might produce a Compound, and also mediately the Forms withal, which is not to create, nor have we any other Philosophy from* Aristotle, *and it is an excellent one, and worthy to be noted.* The same Author in the same place saies thus: *The Form is not produced by it self, but it is comproduced upon the production of the Compound, that is to say, the action is determinated primarily upon the Compound it self, and consequently, and as it were by accident upon the Form.* The Conimbricensian Collegiates in Lib. 1. *Phys. cap. 9. quæst. 12. artic. 6.* thus write: *We answer, by saying in the first place, that no Form except a Mans is properly made; because making is not incident save to a thing subsisting of it self.* And *Ruvio Rodensis*, Lib. 1. *Phys. cap. 5. in quest.* writes thus: *We deny that the form is made of the matter, or of Privation. For according to the propriety of Nature the Form is neither generated nor made, but the Compound, as* Aristotle *expressly teaches, Lib. 1. Phys. text. 64. in these words*: wherefore it is manifest from what hath been said, That whatever is made, is stil the Compound. And *Thomas Aquinas* in their Exposition. *And this Reason proves*: *The making of a thing tends to the Beeing thereof. Therefore it belongs to that only to be made, which hath being: but the Form is not; but it is only said to be the cause of being to the Compound, which is properly said to be. Therefore the form*

form is not made, but the Compound. Which if it be not made; ergo it is not made of the Matter, nor of Privation, but the Compound is said to be made of both, by means of the Form from which it hath its being, and whose Principles are Matter, Form, and Privation. Now to be drawn out of the Power of the Matter is not to be made of it self, but to go into act, as the cause of the Compounds Being, which of it self is generated and made. So far *Ruvio.*

Others contrariwise do oppose this foresaid Opinion as false and absurd. For seeing to the Constitution of every Body, Matter, and especially Form which gives the specifical being, is requisite, and dayly some Individuals perish, and others are generated; of necessity the matter and form which before were not, must be made. But according to their reason which they propound without proof (viz. That neither the Matter nor the Form is made, but the Compound) nothing should be made; since of the Matter and Form the Compound consists, and the Compound is nothing but the Matter and Form. Nor to the making of any thing is a compleat Being requisite, but any Being is sufficient; and that which now is what before it was not, is justly said to be made, whether it be an incompleat Being, or a compleat and Compound. And those are words and sounds without Sense, that Forms are not produced, but comproduced, and that they are not primarily made, but by accident as it were produced upon the production of the Compound. The Compound (truly) is primarily intended in the whol Generation, but it cannot be accomplished unless al things are made which are required to its Essence and Constitution. Yea, they themselves who deny that Forms are made, forgetting themselves they say they are made, when they teach that such things as are drawn out of the power of the Matter do depend upon the matter in their being, making, and operation. Nor do they remove this doubt; but they are forced to explain whence Souls proceed; and at last they are forced to hold, That they are drawn out of the power of the Matter.

And therefore it cannot be simply denied, That Souls after their manner (for whether it be a proper manner of speaking, when Souls are said to be made, even the most learned *Caspar Hofmannus*, in *tr. de formarum origine*, at the beginning doubts) are made. Yet if we would speak more properly, they may rather be said to be multiplied than made, according to that vulgar Saying; Every Form hath a power to multiply it self. For those things are properly said to be made which are not at al before they be made. But that is said to be multiplied which whereas before it was one in one Individual, it now becomes manifold, and many in number. Of which I shal speak in Chap. 6.

Souls are rather multiplied than made

Chap. 2. *Whether Souls come from God, or from Heaven?*

Avicenna held, That the Souls of living things did not proceed from their Parents, but from a certain Intelligence the Giver or (as *Scaliger*, *Exercit.* 97. speaks) the Disposer of Forms, which he terms *Colcodea*; and he teaches, That this Heavenly Intelligence uses the Seed as an Instrument to produce the Vegetative and Sensitive Soul, which when he hath produced in a man by help of the Seed, in process of time without the help of any Instrument the Rational Soul is brought in, and into the Body informed with a Vegetative and sensitive Soul he pours in out of himself a Rational Soul, free from the commerce of Matter. And doubtless *Avicenna* drew this Opinion from *Plato* and the Platonists. For they (as may be seen out of *Plato* in *Epimenide & Timæo*, Marsilius Ficinus *super Lib. Platonis de Sanctitate*, and *super Timæum Platonis, cap.* 37. And *Alcinous*, in *Lib. de Doctrina Platonis, cap.* 23.) do hold, That Rational Souls do come from the most good and great God, and the irrational Souls from the inferior gods, which are (according to them) either the Cœlestial Bodies, or their Spirits, and moving Intelligences. But such things as are said of those Intelligences in Natural Philosophy, since they are said without any reason, they are worthily rejected by Philosophers. And if there are any Heavenly Causes at al, which make towards the Generation of things, they are remote causes, and universal, as shal by and by be said concerning the Opinion of *Fernelius*. And if by that first Intelligence they mean the most good and great God, this Opinion is also false. For the Question is not here concerning the Creation, but the Generation of things. But God after he once ceased from Creation, does create nothing unless it be miraculously; but he hath ordained Nature which performs the Course of Generation and Corruption, and defends and observes the same. And now indeed, God concurs as the first and universal Cause in the Generation

The Souls not from God.

How God concurs with second causes to the generation of things.

neration of al things, but the things produced are the immediate effects of the second Causes: And God is said to be the Efficient Cause of al things, both because he first created them, and because he gave to the Second Causes the force and ability to produce their Effects. This indeed is true, That the second Causes cannot do any thing without the first, viz. Because from it al created Agents depend and have their Essence, and without the assistance whereof they could neither consist nor perform any operation; and unless the first Cause concur to the Act, the second cannot perform their operations. Yet the Second Causes do really act, and God acts in al, so as that they may work also; whence *Scaliger* in *Theophrast. de Caus. Plant. Lib. 5. cap. 1.* writes, That Nature is the Power of God in second Causes, to which he hath prescribed certain Rules. And if the second Causes did nothing, why should there be so various a Fabrick in things created, and why are so many Vertues and activities bestowed upon them? and why cannot lifeless things perform the same Operation as living things? And therefore since in the generation of other things we do not look simply to God, but joyn also the second Causes; why should we reject them in the Generation of living things? And if Souls should proceed from God alone and immediately, like could no waies be said to generate its like, nor could that from whence the seed of a Plant or Animal is taken be termed the Parent of the new Plant or Animal, but God. And if they should say that God uses the seed as an Instrument: yet as an Instrument, viz. a Chizel cannot be called the Efficient Cause of an Image, nor the Image be said to be the effect of the Chizel: so neither can a living Creature be said to be the Off-spring or child of the seed. In a word, if any superior Cause whatsoever, by *Plato* and the Platonists, or by *Avicenna*, shal be held the Efficient Cause of Souls, there wil be after this reckoning no univocal Generation; whereas nevertheless most certain it is, nor needs it any proof, That like begets its like, an Oak tree an Oak, a Horse an Horse, a Man a Man.

And what the Platonists say touching the inferior gods, if they are to be understood as the words intimate, any one may easily see that they are not only said without al reason, but void of Truth.

Whether Souls come from Heaven?

The Opinion of Fernelius.

Fernelius differs not much from them, who *Lib. 1. de abdit. rerum causis*, in many places eagerly defends that every Soul comes from the Heaven, & that the Heaven sends every Soul into matter prepared and fitted. For thus (in chap. 5. towards the end) he writes; *In the Generation of living Creatures the seed conceived is by the Vertue and benign warmth of the Womb stirred up to action, not that it might raise up out of it self a Soul, or the form of an Animal, but only that the power and faculty thereof being first stirred up and provoked, and afterwards augmented, might furnish its subject matter with all kind of preparation, that the substantial form may at last be received thereinto from without.* He propounds the same Opinion at large, chap. 7. and afterwards, chap. 10. he ads: *The Heaven* (saies he) *without any Seed brings forth many Plants and Animals; but Seed breeds nothing without the Heaven. The Seed does only neatly and decently prepare the Matter, the Heaven sends the form into it when it is prepared, and the chief perfection, and stirs up life in all.* And at last he concludes: *Whatsoever things God made of old in Heaven or in Earth, he alone defends and governs them all, the Heavenly things indeed by himself immediately; but living things and Plants, and other mortal Creatures, by help and assistance of the Heavens on whom he hath imposed the Procreative and Conservative Laws of Nature. And therefore the only form of Heaven does potentially contain the forms of Live Creatures, Plants, Stones, Metals, all that ever have been or can be; and it being big as it were with innumerable forms, engenders and pours all things out of it self: the only power and faculty thereof contains in it all the faculties of mortal things which ever have been, or shall be hereafter. And these Vertues the Soul of the World shed into the whol Universe from Heaven bestows upon all things, as also their form, and native, and vital heat, fit to generate and to conserve them. It contains all things, and cherishes al things with heat and life, so that there is not any where any thing not replenished with the fulness hereof. By the vertue and means hereof both all lifeless things are by themselves, and al animated things have such a Soul as belongs to their kind, some a nourishing, others a sensitive, and others a rational. So she accommodates her self to things, so subservient she is to the Natures of each one, that she gives as much as the Nature and condition of every one desires, and as much as the preparation it self of the subject can bear. The Sun though exceeding far off; yet so bestows his light upon the bodies opposite unto him, that they are bright and shine with splendor: but Water after one manner, a Stone after another manner, Wood after another manner, Silver after another manner, Even so, much after the same manner, that Vertue also which comes down from Heaven is vital, yet so that upon some things*

it bestows only a Beeing, to others also a Soul, and that either nourishing, sensitive, or rational: for it is not received after one manner of all. But of this also I would last y admonish the Reader, That the said Cœlestial Vertue it self is not alwaies alike, nor does bear it self alwaies alike to sublunary things, but differently at different times, according to the manifold posture of the Stars, whose commixtion and complexion does for the most part vary, although the Substance of the Soul of the World (or carrying spirit) is unchangeably one. It cannot therefore come to pass (as one man saies) that the Soul of the World so imparts life and state to all things as that it needs not the least help of the Stars. If this were so, why I pray you should it not alwaies generate like things, and after the same manner, seeing it is alwaies alike present to things. So far *Fernelius*.

Now the chief Arguments whereby he endeavors to prove his Opinion are these: The first is, That of putrefying matter many Animals are bred, which since they come of no Seed, and from no Parent, he concludes their Soul comes from Heaven; and therefore since those more ignoble Animals receive their Souls from Heaven, he thinks the more nobler Creatures, as a Man and a Lyon, should much rather receive their Souls from Heaven. Secondly, seeing *Aristotle* writ, That a Man and the Sun beget a Man, he conceives they do not both concur after the same manner to the generation of a Man, nor that the same thing is effected by both of them; but since two things are required, the Matter and the Form, that by Man as the more imperfect nature the Matter is prepared, and the Soul sent in from Heaven. Thirdly, He disputes at large against the Eduction of Forms out of the power of the matter. Fourthly, He produces many things touching the nobility of the Heaven, and its action upon these lower bodies. Finally, Since the Soul is united to the Body by help of an Heavenly kind of heat and spirit, he holds the Soul it self must much rather be of a Cœlestial Original.

Fernelius his Opinion of the Original of Souls confuted.

But in good deed this Opinion is far from the truth. For seeing that living things which are generated are of the same sort with those by which they are generated, how can this be true if the Generator do only dispose the matter to receive the Form, and do not impart the Form it self? and al living things should rather be termed the Off-spring of Heaven, than of those things by which they are geuerated. And though there be a content of the upper and lower bodies, and the Heaven as an universal Cause does further the Original of things; yet it does not follow, That the Heaven gives Forms to so many several sorts of things. And what need is there to derive the Souls of things from Heaven, since God the Creator in the first Creation gave to al living things the power to multiply themselves.

His Arguments.

Nor are those Reasons which moved him to maintain this Opinion of any strength. For in the first place, That living things Generated of themselves have their cause here below shal be shewed hereafter. Nor if there be any thing noble here below must that needs be deduced from Heaven, but living things themselves have their degree of dignity; and man the most noble of al is nobler than the Heaven. Secondly, though *Aristotle* wrote that the Sun and Man generates a Man; yet is not that to be otherwise understood than that the Heaven as a remote and general Cause, and Man as the immediate Cause generates a Man. Nor (as was said) is Man more ignoble than the Heaven, so that he only should prepare the Matter, and the Heaven give the Form. Thirdly, He does rightly oppose the Eduction of Forms out of Matter, and we shal do the same hereafter: but it does not follow, If Forms are not educed out of the Matter, that therefore they are procreated by the Heavens. For we shal hereafter demonstrate another manner of their Original. And as in the fourth place we grant the Nobility of the Heaven, and its action upon these lower bodies; yet it no waies follows therefrom that it is the Author of al Forms. Finally, although it were granted that the innate heat and spirit, which the forms of living things use as their immediate Instrument, and which may therefore be called the band of the Soul and Body, may after a sort be termed Cœlestial; yet that only does thence follow, that the Souls themselves are more noble than that spirit and inbred heat, but not that they proceed from Heaven. In a word, as *Thomas Erastus, de Occult. med. propriet. Lib.* 1. *cap.* 17. does wel write: They that dare affirm the Forms of the sorts of things are infused by the Stars wil be laught at by Philosophers; and by Christians also rightly judged execrable. The Forms have received their Original not from Heaven, but from the Creator, if they wil rather beleeve the History of the Creation than lying Fables. God commanded that every Species or sort of things should propagate it self by multiplication of Individuals endued with the same Faculties; he did not command the Stars either to imprint their forms or vertues on the things created.

Thus have we shewed how some without Reason have endeavored to draw the Original of the Forms of Living things from the Heavens.

CHAP.

Chap. 3. *Some other Opinions of the Original of Souls reckoned up, and a vulgar Error taxed.*

A twofold Generation of Living things.

SInce therefore the Soul proceeds not from the Heaven and superior Causes, many grant that like begets its like. Which yet most do understand only of univocal Generation. For they hold a twofold Generation; one univocal, whereby like begets its like; the other Equivocal, where the Ingenderer is of a different nature from the thing ingendred; which they say happens in such things as are bred of themselves, and without Seed. But whether there be any such Equivocal Generation, and what the Nature of the Spontaneous Original of living things is, we shal shew hereafter in its place. It suffices in this place that in Univocal Generation so called, it is granted by most, and by al that do not draw the forms from Heaven or a superior Cause, that like engenders its like. Yet in good deed, although al agree herein; yet they differ much as touching the manner, and there are many and divers Opinions of Authors hereabouts, al which may nevertheless be (I conceive) reduced to four Tribes. For first some hold the Seed to be inanimate; who are again divided into two companies; whiles some hold the Seed communicated by the Generator to be only instead of matter, out of the aptitude whereof the Soul is educed by an external Agent: some say there is a formative Vertue communicated to the Seed by the Generator, and they hold that it is the shaper of the Body of the living thing; or they conceive the Generator uses the Seed as an Instrument to beget its like. But others hold that the Seed is animated; yet they are of two opinions; for some hold there is in al Seed (even that of a Man) its proper Soul; but some conceive the Soul of Man (by reason of a singular prerogative) is to be exempted, and that it comes into the Body after it is formed from without; though they themselves differ about the time when the Soul comes: Touching al which Opinions we are now to speak severally.

Four Opinions concerning the Generation of Living things.

The Original of the soul in general is to be enquired into.

Howbeit the Reader must first be warned of a vulgar Error. Since all living things are what they are chiefly by their Souls, and thereby they differ from lifeless things; therefore with good reason our enquiry touching the Original of Souls must be here so ordered that it may concern al living things in general. In which thing nevertheless I see many offend, who deliver what should be said of the original of the Soul, and formation of the Body of a living thing in general, concerning a Man only, and so they offend against the Law of Demonstration, endeavoring to demonstrate the affections belonging to the whol kind of one sort only. I conceive it therefore more convenient to propound in general whatsoever may be said of the Original of living things, and of Souls in general; and afterwards to apply them particularly to Plants, Animals, and Man-kind; and what these sorts of living Creatures have peculiar, to set that down by it self.

Chap. 4. *Whether Souls are drawn out of the aptitude of the Matter.*

Whether Souls are drawn out of the aptitude of the matter

IN the first place therefore, amongst those who hold the seed to be inanimate, it is a common opinion, that all forms and consequently all Souls, except the rational soul of a man are drawn out of the aptitude of the matter. But who was the first Author of this Opinion, is not so certain. Most do indeed father it upon *Aristotle*; but I doubt whether it can be demonstrated from his works. Some, and amongst them *Franciscus Bonamicus*, do attribute to *Averroes* this Opinion; and some such words are found in his Books; but it many times happens, that Expositors patch many things of their own upon Authors. But whether he held what is vulgarly taught is a great question. For it is apparent, as from other places, so from 7. *Metaphys. text.* 31. That he held the Cause of the Generation of living things, or rather of the formation of a living Body, to be the form lurking in the Seed. For seeing there *Aristotle* compares Artificial things with Natural, and touching the Seed which is the Efficient, he saies, It makes, *Averrhoes* adds; the Seed generates by a power it hath like to an Artificer; because the form of the thing generated is potentially in the Seed, and that of which the Seed is agrees in name and nature with that which is any waies made of the Seed. And a little after: In the matter of things generated there is an aptitude that out of it may be bred a like thing by the power which is in the Seed.

Who was the Author of the Opinion of drawing of forms out of the aptitude of the matter.

But

But moſt of the Schoolmen and their followers have fiercely maintained this Opinion of the eduction of Souls out of the aptitude of the matter, and have handed it over to poſterity without any cleer ſence, which a mind deſirous of truth might conceive; ſo that moſt of them ſeem rather to have tranſcribed the words of their Maſters, than to have underſtood the thing it ſelf. And how indeed could they underſtand where there was nothing to be underſtood?

But whoever was the Author of this Opinion, and whatever Patrons it hath; it muſt by al means be weighed and conſidered, ſince many contend for it as if their life lay at the ſtake, and uſe it as an infallible Principle to decide many Controverſies. Now two things theſe Authors do: Firſt, they ſet down the reaſons moving them thus to think, or rather they oppoſe the Opinions of others: and in the next place they endeavor to explain and declare their ſaid Opinion.

And in the firſt place (truly) as appears out of *Fonſeca*, *Comment. in* 5. *Met. cap.* 2. *quæſt.* 4. Suarez, 12. *Metaphyſ. diſput. Sect.* 1, 2. Bonamicus, Ruvius, *in* 1. *Phyſ. tract.* 2. *quæſt.* 1. and others, they bring hardly any evident reaſons for their own Opinion, but only endeavor to bring thoſe that think otherwiſe into ſome abſurdity; which is a very ſuſpicious way of dealing. For it is the part of a good and Ingenious Diſputer firſt to prove his own Opinion with firm Reaſons, afterwards to oppoſe the contrary. And nothing can be ſaid ſo true and manifeſt which by contentious wits may not be called in queſtion. I count it not worth the while to tranſcribe the places of Authors entire; ſeeing they are in the hands of al, and moſt of them bring nothing new, but repeat the ſame thing over and over again. But if any reaſons may be gathered out of them, they are theſe:

Reaſons for the Eduction of forms out of the aptitude of the matter.

In the firſt place therefore, They would prove that Forms are drawn out of the power of the Matter, becauſe they depend upon the Matter in their making, their being, and operation. But this is to beg the Queſtion, and there is no connexion of the major. For we grant indeed that thoſe inſeparable Forms cannot be made (or rather propagated) without the matter, and that they are, and work in, and with the matter: but it does not hence follow, that the Form is drawn out of the power of the Matter, and depends in its eſſence upon the matter, which is meerly paſſive. But the Queſtion ſtil remains, Whence thoſe Forms which can neither be made, nor be, nor operate without the matter, or out of the matter, have their Original.

Secondly, Unleſs we hold that Forms are drawn out of the aptitude of the matter, they conceive al Generation is taken away. Which argument whether it be a direct proof, or a deduction to an abſurdity, I leave to others to judg. For either (ſay they) the Forms are ſomthing before Generation, or they are nothing. If they were before Generation, there can be no Generation; if they are nothing there wil be a Creation, and ſo Generation is again taken away. But this Dilemma is of no weight, nor is there any ſtrength in either of its horns. For ſince they were al for the moſt part Divines who thus wrote, they ought to have conſidered what that text of Scripture imports, *Encreaſe and multiply*; yea, and how that axiome of Philoſophers is to be underſtood, That every Form can multiply it ſelf. For if they had underſtood that Souls can multiply themſelves, they had underſtood withal that when any particular thing generates, a ſoul is not created anew, but multiplied; and that the Souls of the firſt Individuals of every ſort, created by God at the beginning of the World, did and do ſuffice to propagate al the Souls of al the Individuals that ever have been, or ever ſhal be; and they had underſtood withal that when Souls which were before are multiplied, generation is not taken away, but rather eſtabliſhed. For though the Soul were before, and only one in number; yet when it multiplies it ſelf, and diffuſes it ſelf into more Individuals, Generation is rightly ſaid to be made. Where notwithſtanding we muſt preſently obſerve when Generation is truly made. They indeed hold, when of a grain of Wheat there ſprings up a Wheat ſtalk and ear, or when a Chick comes out of an Eg, then generation is made. And it may indeed be granted, that after a ſort Generation is then made. But if we would ſpeak properly, ſince Generation is (as *Ariſtotle* teaches, *de reſpiratione, cap.* 18.) *The firſt communication of the nutritive Soul together with the inbred Heat*; that communication is then performed when Seed is bred and ſeparated from the Generator: and then Plants, then Animals breed, when they communicate their Soul together with their native heat unto the Seed, and caſt the ſame forth of themſelves, but not when a Plant or Animal is produced of the Seed. Which is hereby apparent, in that when Plants ſpring up out of the ſeed the Plant that bred the ſeed may be deſtroyed, and when the Chick is hatched out of the Egg, the Cock and Hen whence that Egg came may be both dead, and ſo can neither communicate the Native Heat, nor the Soul. And therefore *Julius Cæſar Scaliger*, *Exercit.* 6. *Sect.* 10.

How living things are generated.

when generation of living things is truly made

The Tree ingenders (saies he) when it produces Seed; but a Tree is not generated when it shoots up from the Seed; but then that which was generated and imperfect is perfected. So a Dog does not engender when the Whelps are brought forth, but when the Seed is bred.

whether that Opinion of the eduction of forms out of the power of matter can be explained.

But when they that hold Forms are drawn out of the power or aptitude of the Matter would explain their Opinion, they variously and miserably vex themselves and trouble their Brains to no purpose; as is usual when there is nothing at the bottom; and while they endeavor to explain the matter, they rather obscure and perplex the same, as may be seen out of the Authors fore-alleadged, also from *Tolet.* 1. *Physic. cap.* 9. *qu.* 19. and 1. *de generat. & corrupt. cap.* 3. *qu.* 2. Benedictus Pererius, *Lib.* 5. *Phys. cap.* 22. and others, whole words I think not fit to transcribe; and at last when they have turned this way and that way with much anxiety, at last they conclude with those words of *Aquinas*, *Part.* 1. *Quest.* 90. *artic.* 2. for the Form to be drawn out of the aptitude of the matter is nothing else but for a thing to become actually what it was before potentially. But whether this can satisfie a mind that hungers after Truth, I leave to the Reader to judg. Whence *Tolet.* 1. *de Gener. & Corrupt. cap* 3. *quest.* 2. *I confess* (saies he) *this is a wonderful Vertue which partakes of a creating power; but it is not a creating power because it alwaies works upon subjects. The Vertue also of the matter is wonderful, out of the aptitude whereof are brought things which are not actually.* Where rather he should have admired at their stubborn headiness, who would needs have it to be brought out of the matter which is impossible, and is neither in the power of the Matter nor of the Agent, than at the wonderful power of the Matter which is none at al. And *Benedictus Pererius*, *Lib.* 14. *cap.* 9. at the end, where he treats of the Original of Forms, and endeavors to answer some doubts, at last he concludes: *Whether these Answers are true, and whether they quite take away the difficulties proposed I leave to the judgment and consideration of learned men: they do not (truly) quite take away my scruple, nor perfectly satisfie my mind. For they involve certain things which seem either absolutely false, or more doubtful than that whereof we now doubt; such as is that there is an* ultimum *or last of Quality, which may be brought in in an instant.* And indeed they can no waies answer the doubts that are brought against their Opinion. For if you ask them, what it is to be brought out of the power of the matter? or what that power is? they answer, That it is the disposition of the matter to a certain form, that when the ordinary power of the Agent or efficient is added, a form grows and results therefrom. But when they themselves grant, that this disposition belongs to the second matter (not to the first, for that is indifferent to receive al forms, nor more determined to one than another. And if the first matter should contain al forms in its bosom, and the forms did owe their Original to the first matter, that matter were a more noble principle than the form) since one disposition is required to the form of an Oak, another to the form of a Chick, another to draw out the form of a Horse; and the same Expounders of *Aristotle* determine, that the Matter wherein such specifick forms hang, is the Elements variously mixed and disposed: it is demanded (since they hold the form is made actually, which was there before potentially) Whether it be made of nothing? or whether that same disposition and Qualities of the Matter, which are nothing but a certain temper of a mixed body, or the very form it self of the mixt Body or Elements, is changed into the form of an Oak, an Hen, or an Horse? None of which can be said without absurdity; since neither an accident can be changed into a substance, nor one form into another; nor can the forms of living things be compounded of the Elements. And which way soever that disposition to the form can be explained (since it is made successively by parts, and the last degree is of the same kind and perfection with the former) it cannot make up the act of a thing, nor give Essence to a Substance.

Absurdities which follow the Opinion of drawing the Forms out of the aptitude of the matter

Moreover, Neither can they produce any thing of certainty concerning the immediate and principal Efficient of that Form which they say is drawn out of the power of the matter. The matter it self being a passive principle cannot be the Efficient cause; nor the Sun, or other Stars (since they are only remote and specifical, not universal causes, as was said before, Chap. 2.) Nor the external Heat of the Air, Womb, Hen-sitting, Furnace, or any external thing whatsoever. For so a substance should be produced by an accident. Moreover, there could not be assigned a specifical Cause of a special Effect; but the same special Effect should be produced by divers Causes: as we see Plants sprout out of the Seed both by the heat of the Sun and of a Stove, and the Chickens of one Bird hatched by another Bird not of the same, but a different kind; yea, and the seeds of Silkworms are hatched in the bosom of a Damsel, as *Vida* relates in his *Poeme of the Silkworm*. Moreover by the action of one

one Agent moſt different Forms ſhould be produced. For ſince in the ſame Garden moſt different Plants do grow, they cannot al proceed from the ſame Agent, viz. The external Heat. Moreover, according to this Opinion the things generated ſhould not have their form from the Generator, but only a diſpoſition to the form, which afterwards of its own accord upon the action of an external Agent (as Heat for example) ſhould ſpring out of the power of the matter, the Agent communicating nothing thereunto. And ſo according to this Opinion it cannot be ſaid that a living thing begets its like, nor that every form does multiply it ſelf: which yet al ſound Philoſophers do grant. For if the Generator ſhould tranſfer nothing of its own Eſſence into the thing Generated, but ſhould only determine the matter to ſuch a like form, and afterward the Efficient (which is not of the ſame kind) ſhould make it actually to break forth; how I pray you can the form be ſaid to multiply it ſelf? Verily, if ſome Plant in the *Indies* when it produces Seed gives nothing but the matter with a determinate aptitude to receive a like form, out of which after a yeer, two, or three, the Plant it ſelf being now burnt or putrefied, the form ſhould break out by vertue of heat, not only of the Sun, but of the fire in a ſtove, as the Agent: that Plant cannot be ſaid to have bred its like, nor that form to have multiplied it ſelf. Nor is it enough to cauſe an univocal Generation, and the true production of a like Eſſence, to afford a matter with ſome proclivity and propenſion to receive the form. And after this reckoning the Agent heat (and that an accident) ſhould confer more towards the Generation than the Generator it ſelf, ſince it makes the form actually to ariſe which the Generator cauſed to be there only potentially. And thus it remains yet unexplained, whence the ſubſtantial and ſpecifick form of a thing, or that more excellent, more divine and chief part of a thing hath its Original. Mean while we grant that the diſpoſition of the matter is neceſſary to the Generation of living things, ſince every matter is not fit to receive every form, but a determinate matter a determinate form: but not that the form or ſoul ſhould be made out of it; but that it may be propagated thereinto, and afterwards dwel therein, as ſhal be ſaid hereafter.

The Opinion of Fortunius Licetus concerning the Eduction of Forms out of the aptitude of the Matter.

Fortunius Licetus, *de ſpont. vivent. ortu, Lib.* 1. *cap.* 83. endeavors to explain the Eduction of forms out of the power of the matter, after this manner: We ſay (quoth he) that the Eduction of the form out of the boſom of the matter is not the drawing out of that which lies hid into the open view, but the converſion of aptitude into act. For the form which is produced by the Agent only by the tranſmutation of the matter did potentially pre-exiſt therein, out of which it is brought into act. Moreover, we deny that the Form is made of nothing, and abſolutely created, if it be granted that it is not made of the matter as a principle, nor out of that in which it did actually pre-exiſt. For in the firſt place, whatſoever things are truly created they are made ſimply of nothing, and of no ſubject at al; but al forms under the Soul of Man are made of nothing of their own, but not abſolutely of nothing, as thoſe things which are created; ſince forms are made by the agent, by a tranſmutation made in ſuch a determinate ſubject, on which therefore the forms depend in their Being, and by which added to their Eſſence they are defined according to *Ariſtotle*. Again, if it were not ſo accidents alſo ſhould be made of nothing, and moſt properly created: for no heat did pre-exiſt in the water which is made hot. But verily forms are not truly created, nor are they out of nothing of their own, but properly out of the boſom of the Matter they are drawn, and out of the aptitude thereof, becauſe they are truly generated of ſome rudiment of themſelves pre-exiſting in the matter, which rudiment of the form is perfected by the action of the Agent, and turns to a perfect Form. So far *Licetus*. But this is a vain put-off. For let *Licetus* teach us what that Rudiment of a Form is. Whether the ſubſtance of the matter it ſelf, or ſome accident thereof. If the former, (to which he ſeems to incline when he writes that the forms are made by the agent, by a tranſmutation made in ſuch a ſubject ſo determined) then the matter ſhould be changed into Form: if the latter, an accident muſt be changed into a ſubſtance. Let him ſhew us alſo, that there is any rudiment and beginning of a form, ſince forms are indiviſible, and have their Eſſence like numbers; and therefore where they are they are totally, or not at al. Nor does the ſame *Fortunius Licetus* explain this matter more happily, *Lib.* 4. *de ſpont. vivent. ortu, cap.* 15. where he defines the Beginning of Forms, and holds that in the matter there is pre-exiſting a rudiment of the future form, that the generical nature of that form remains under the oppoſite privation, to which the efficient cauſe joyning the ſpecifical difference of the form is ſaid both to conſtitute the form, and to further the Generation, and at once to generate a ſubſtance compounded of matter and form. But that ſame pre-conceived Opinion touching the eduction of forms out of the power of the matter ſeduced that man, otherwiſe a moſt diligent ſearcher into Nature. For no form is capable of more or leſs, but conſiſts in an indi-

visible point, nor can it be remitted, since remission is made by mixture of a contrary, nor is it possible that the form should first have a generical Nature, and receive the specifical difference from the Efficient. And whereas *Licetus* denies those axiomes owned byal Philosophers, and saies they hold true only in compound substances, but not in simple; this he does without Reason. For since compound substances become such by reason of the simple of which they consist, if the simple substances, matter, and form, may be remitted, also the compound might be remitted; and since the form gives being to the thing by reason of the form the compound also should be more or less such. Nor does *Licetus* agree with himself in this point, since in the same Book, chap. 2. he writes, That those things which are said to breed of themselves are not made by an external Agent, but by an Agent which lies hid in the matter of the thing to be made, which does not generate a new form different from it self, but exhibits it self thereto for a new form, that is to say, communicates it self. Nor is there in the Soul (which is a most simple Essence) any composition of sundry Essential parts, and in such a manner, that like a Genus it might be present without a specifical difference. The Soul is one most simple Essence, only furnished with sundry faculties. Nor can he shew how that remission is made. For whereas *Licetus* saies, that only an accidental remission or abatement is made by the mixture of a contrary, but not an essential, such as he holds to be in forms, is asserted without any reason; and it lies him in hand to prove, That (as he feigns) an essential remission may be made without admixture of a contrary. And which way soever he turns himself he fals into absurdities, and contradicts himself. For when he saies that that same rudiment of a form is no true form, but the generical Nature thereof, and that the kinds have an Essence really distinct from their sorts, he confounds Logical Conceptions with the Nature it self of things, or the Logical kind with the Natural. For the Logical kind is in the mind, and is by the mind abstracted from the sorts; but the Physical Genus signifies a common nature, which consists in the things themselves out of the Mind. And the Logical kind indeed may by the mind be separated from the sorts; but the Physical kind does not exist in Nature, save in its sorts, nor does the Animal exist any where save in a Man, a Lyon, a Horse, &c. And therefore it is a vain figment to say that the Generical Nature is the Rudiment of the Form, and as it were half the Form. And from this very Opinion it would follow, that like does not engender its like. For since the specifical Form gives to every thing its Nature, but not the Generical; if the Generator should only afford the matter wherein the Generical form is, or a rudiment of the Form, or an half form, as *Licetus* speaks; but the external agent as Heat should introduce the specifick difference; not the Generator which might die in the mean time before the external agent come should be the Parent and Author of the thing generated, but the external Agent; and that not univocal, but equivocal. Also I wonder a man so exceeding learned should defend this Doctrine of the Eduction of Forms, since he hath no need thereof to explain his Opinion, as holding in 1. *de sponte vivent. ortu, cap.* 125. That the seed is animated, and *Lib.* 4. *cap.* 32. that it is an imperfect Animal: and he holds that such things as are said to be generated of their own accord do not proceed from an external Agent, but from an Agent that lies hid within the matter, as was lately said.

The difference of a Logical & a Natural kind.

But which way soever they turn themselves, the matter comes to the same pass, that they are fain to confess, that besides the disposition of the matter there is somwhat formal in the Seed, the cause of action, and that besides the disposition of the matter there needs somwhat else by which the thing may be brought into its perfect act. And that power of which they speak they are forced at last to explain to be meant not of a passive power, but an active, which makes that that which is in the first act come to be in the second act, or in an act simply; so that that Soul which was destitute of Instruments to operate by is now furnished therewith, so that it is able to operate. Which very thing also *Aristotle* taught; when in 7. *Metaphys. cap.* 9. *tit.* 31. he writes: *The Seed hath the Form potentially in it self, which after a sort hath the same name with that from whence it came.* And 2. *de Generat. cap.* 1. *It is all one whether you name the Seed, or that from whence it came.* For the Sum of the business is, That that Power which *Aristotle* speaks of is formal, as later Writers phraze it, and differs not from the first act.

Whether the Eduction of the Form out of the aptitude of the Matter be founded on the holy Scriptures

A certain late Writer (whose Understanding is capable of nothing but what is Elementary) when he saw he could not defend the Eduction of Forms out of the power of the Matter by any Philosophical reason, at last he flies to the Authority of the Holy Scriptures. But he endeavors to introduce his own mind and pre-conceived Opinion into the holy Scriptures, whiles he holds, that *Moses, Gen.* 1. when he brings in *God* saying; *Let the Earth bring forth, let the Water bring forth the living Creature,* does assert that the Souls of Plants and

and Beasts were then by God produced, and do at this day arise from the Elementary matter. And thus therefore he explains it, that the specifical Forms are not made of the Elements, inasmuch as they are the matter of the mixtion, and the convenient subjects of Forms; or that they are not made by mixture and composition of the Elements, but that the Elements concur to the generation of corruptible things as they contain an universal matter so affected, under the matters of the Elements, that out of the aptitude thereof as out of a rich and unexhaustible Treasure might be drawn and propagated to the end of the World the sorts of all things, such and so many as the most good and great God would have to exist for the accomplishment and ornament of this lower World. For since the Elements contain no matter but the first, he must needs by that universal matter understand the first matter. But who I pray you, either Philosopher or Divine, did ever so teach concerning the first Matter, especially being considered without the Forms of the Elements? Did *Aristotle* (whose Opinion he conceives this of the Eduction of Forms to be) know any thing of that Divine Benediction given at the first Creation? And where do we read (I pray you) in the Scriptures that God so blessed that Universal Matter? This indeed we read in the first of *Genesis*, That God once commanded that the Earth and Waters should bring forth Animals created by him; and when they being created by God were come out of the Earth and Water like a Child out of the Womb, as *Franciscus Junius* speaks in his Explication, we do not read that God again commanded that the Earth and Water should produce Plants and Animals, and that he blessed them to that intent; but thus we read, That the Earth brought forth the green Herb bearing Seed, and the Tree bearing Fruit, and each thing having seed according to its kind; and that God blessed the Fishes and Birds being created, saying; Encrease and multiply, and fil the Waters of the Sea, and let Birds multiply upon the Earth.

Chap. 5. *Of the Formative Principle, and the separated Instrument.*

WHen other more solid Peripateticks saw these difficulties and encombrances of this Opinion, they held that the Soul indeed it self did proceed from the Generator, but not immediately. And therefore they denied that the Soul was in the Seed; yet they taught that there was a vertue therein communicated from the Generator, from whence came both the forming of the Body and the Soul of the thing generated. Of this Opinion was *Albertus Magnus*, who taught that the Generator does indeed communicate Seed, but not the Soul with the Seed, but that it only gives a vertue to the seed, by means of which (though the Generator be dead) the Seed gives a Soul to the thing generated, so that the seed which hath not the Soul in it does yet generate a living and animated thing, not of it self, but in the vertue of the Generator. For as we see in the motion of things hurled, that they are moved not by themselves, but by the force imprinted by the Thrower, although the Thrower and thing thrown are no longer together; and by the Hammer an artificial thing is made, not by its own faculty, but that of him that works with it: so by the Soul-less Seed a thing with a Soul is generated by a vertue imprinted therein by the Generator.

The Opinion of Albertus Magnus concerning the formative Faculty.

That most learned Philosopher *Jacobus Schegkius* seems to be almost of the same Opinion, who in *Lib.* 1. *de Plast. sem. facultat.* attributes a Formative Principle to the Seed, and teaches, That he thereby understands a substantial Form, which could be perceived by no sense, but by the mind and understanding. Howbeit, he holds that the Seed and this substantial Form are not principal but instrumental Agents, and form the animated Bodies like the Hand of an Artificer. He saies, That it is a substantial Act, separable from the substance of the first Act, which hath for its proper subject the Spermatical Humor. And again, that the Seed is an Instrumental Cause, and a certain efficient Principle, but not an efficient Material, making or generating the animated Body, and not being it self animated, but a Medium interposed betwixt that which is animated and that which is to be animated, without the information of any matter able to effect as a certain second act or energie. But unless the Opinion of *Schegkius* be so explained, that this Formative Principle is the Soul it self by which the Seed is animated, and the Seed of such or such a Creature; and that the Formative Power is a proper adjunct of the Soul, which it hath when it is in the Seed, and exercises the same when an Animal is generated; but inasmuch as there is not in the Seed actually an Organical Body which the Soul may inform, in that respect the Form may be said to be absent;

The Opinion of Jacobus Schegkius.

sent: then it cannot be admitted. For to hold a Formative Principle which is not the Soul, is rashly to multiply things more than needs. For since al the proprieties and operations of the Soul are found in, and attributed to this Formative Principle, why should it not be called the Soul? And seeing the Soul in the Seed is sufficient to perform al these operations which are attributed to the formative Principle, why should we hold that to be any other than the Soul? And *Aristotle* himself *de generat. Animal. cap.* 1. names this Principle a part of the Animal, which is forthwith in the Seed. And therefore we need not hold a Formative Principle as it were a second act of another first act, and the Vicar as it were of the Generator in the Seed, which when the motion of Generation is ceased, it self ceases. *For to hold that that which made either all or some parts of the Body is perished, is an absurd thing.*

The Opinion of Sanctacruz concerning the Instrumenium sedaratum.

The same Opinion (in a manner) *Antonius Ponce Sanctacruz*, the King of *Spain*'s Physitian, holds, *in opere supra primam* 1. *Canon. Avicennæ, & de Hippoc. Philosophia*, as he is cited by *Fienus* in his Apology. For he holds the Seed to be only an Instrument. But when he easily perceived many absurdities would follow if the Seed should be counted simply as an Instrument, he distinguishes betwixt an Instrument conjoyned and separate. And he conceives that the necessity of this distinction is taken from the diversity of the perfection of Agents, and the Nature of the Order of things. For some operate with a Medium and without a Medium as living things; others of an inferior Rank have not so great perfection, and they work by themselves. He tels us therefore that separate Instruments do work by a permanent Vertue which they have received from the Agent; but the conjoyned Instruments do successively receive the Vertue of the Agent, and therefore operate with dependance upon the first principal Agent. He explains the Nature of a separate Instrument by an Example political. For a King or some Potentate operates in far distant places as if he were present, by power derived from himself, which he confers upon the Laws and Judges: but private men that live only for themselves must operate by themselves. He brings afterward another example whereby he would prove his Opinion, viz. Of Watches, Clocks, and Engines wherein many Wheels are orderly moved in the absence of the Workman, yet by a vertue imprinted upon them by the first direction of the Artist. The Nature of conjoyned Instruments he explains by the similitude of a Saw, which lying stil hath such a disposition that it may receive motion in order to cutting; yet is it not an acting Instrument til it receive guidance to motion and cutting from the Sawyer. That there is a separate Instrument he also proves by the motion of hurling. For a stone hurled wil fly, though the thrower should presently fal down dead. And so he holds it is in the matter of Seed, how that Animals Generate their Seed being cast out of them, a derivative vertue continually remaining therein, that it can work, and does actually work without any actual Influx from the Generator.

This Opinion refuted.

But this Opinion however explained and palliated is false and far from truth. For *Aristotle* himself, 7. *Metaphys. c.* 9. *t.* 31. reckons the Seed amongst univocal Agents. But al univocal Agents are not instrumental but principal Causes. Again, al Instruments properly so called are joyned with the principal Agent, and as *Scheghius* himself speaks, an Instrument of it self hath no Efficacy, but only by the Use of the Principal Cause.

There is no separate Instrument which acts by it self.

And those things which are brought by *Antonius Ponce* concerning a separate Instrument (unless rightly explained) are false and feigned without reason, and therefore are not to be accounted a Metaphysical Principle, as he gives them out to be. Indeed the Seed might be called a separate Instrument, viz. Inasmuch as the Seed is not necessarily joyned with the Generator, but is subordinate thereunto, and hath received from the Generator the same power, yea, and the same Soul which the Generator it self hath. But while he denies the Soul to be in the Seed, he labors in vain when he cals the Seed a separate Instrument. For although while an Instrument is not imployed it may be really separated from the principal Agent, as a Pencil from a Painter, an Ax from a Carpenter, a Pen from a Writer: yet no Instrument can be named which in the action it self operates by a power within it self (for so it should be a principal Agent, not an Instrumental) but every Instrument in its operation hath no power of it self, but it depends upon, and is directed in its action by the Principal Agent, and when it is separated it can no longer work by it self.

The first & second Act of an Instrument

We must therefore distinguish betwixt the first and second act of an Instrument. That any thing may be an Instrument in the first act, it is sufficient that it be shaped and fitted as an Instrument for some particular action. An Iron Hammer in regard of its hardness, heaviness, and shape, is an Instrument fit to beat Gold and other Metals, and to figure and form them into some certain shape; but this is only in the first act. For an Hammer thus shaped wil

wil never of it self beat out any metal, but the presence and motion of the Artificer is necessary to dilate the same, and then the Hammer is an Instrument *actu secundo*, by the second act. So native heat is an Instrument whereby Nature digests Chyle, and forms Blood, Flesh, and Bones. But the heat cannot perform this, unless the soul which is the principal Instrument concur. And it is the nature of an Instrument to act above its own abilities, and to produce an effect more noble than it self, viz. inasmuch as it is directed and moved by the principal Cause: which while it so directs and moves does not imprint any virtue upon the Instrument, by which it may perform that Action which belongs to the principal Agent. For neither does the Artist necessarily make his Instruments, but he receives them made to his hand, either by Nature or Art, and he makes use of them being by Nature or Art fitted to his turn, as may be seen in the Saw used by the Joyner, which he had of the Smith, and in the Cole or Chalk which the Painter uses. And therefore that political example of a King working a great way off by Laws and Judges, as a moral Instance, does not square with things natural. And the subordinate Judges are rather Ministers than Instruments of the supream Judg, nor do they act by any Physical Virtue communicated. For neither do Instruments properly so called perform the work of the principal cause as its Vicars or Substitutes, so as to perform the same action with the principal Cause, though after a manner derived and communicated from the said principal Cause; but they are only Con-causes and Co-workers, and unless the Artist did work they should do nothing; and when the motion of the principal Agent ceases, they also cease from their action.

An Instrument directed by the principal Cause acts beyond its own Ability.

As to the example about the motion and impulse of things hurled, it does not sufficently prove the force impressed upon Instruments. For after what manner that motion of things hurled is caused, is not sufficiently manifest, and much controverted amongst Philosophers. It is most likely that this motion is made by the Air, or through means of the Air, and by the force of the throw. For no man could yet ever tel what that virtue is impressed by the Thrower, & how it can be imprinted by the local motion of the Arm, somtimes immediately, otherwhiles mediately as by a Sling where it sticks; how again it is so suddainly lost and destroyed. And there are doubtless more absurdities which follow this Opinion, and therefore it cannot be allowed to confirm the received Virtue of a separated Instrument.

The Cause of the Motion of things hurled.

And as to those examples of artificial Engines, as Clocks, Watches, Water-works; these things are artificial, in which the motive faculty it self, which is wholly natural, is not communicated by Art to those Engines, as appears by the weights hung on by the spring: but that motion is directed by Wheels artificially made. But it is far otherwise with natural Agents.

Some do yet endeavor to declare the nature of a separate Instrument by the Example of a red hot Iron, which sets Tow on fire. For they say, the Heat of the Iron doth produce fire Instrumentally, by virtue of that fire which heated the Iron, and it acts now as its Instrument, no longer conjoyned, but separate therefrom. For that fire which heated the Iron may now be extinguished and put out. But in good truth the hot Iron does not set the Tow on fire by a power communicated from the absent fire, but by the fire which is in the hot Iron having by its smal Atomes insinuated it self.

And therefore these are words under which no truth is contained, that the principal Agent transmits its action by a virtue derived from it self: but the whol nature of an Instrument consists herein, as hath been said, that it produces an effect more noble than it self, and that not like it self, but the Artificer. And this is the common Condition of every Instrument. And therefore an Instrument cannot be divided into a conjoyned Instrument, which acts and operates by somthing participated in a successive being; and a separate Instrument which acts by somwhat participated inherent therein. For it is the nature of every Instrument to operate by somwhat participated from the principal Agent in a successive being. And as soon as that successive Influx of the principal cause ceases, that whol instrumental action ceases also: but that which acts and operates by some participated vertue inherent in it self is not an Instrument, but operates now as a principal Agent; nor does it act above its own ability, which is essential for an Instrument to do. In a word, that Agent whose Effect answers and is equal to a virtue formally inherent in it self, is a principal, not an Instrumental Agent; nor is there any Agent in Nature which receives virtue from another thing permanently inherent in it self after the manner of an Instrument, or which acts by a vertue communicated thereto, and permanently inherent in it self as an Agent *wherewith*; but every thing that so acts, acts as the Agent *which*, as the most learned *Fienus* rightly speaks to this point. And therefore the Seed also sent forth by a Plant or Animal, because by an implanted Vertue though it be no longer governed by another thing it can shape the body of a

Wherein the nature of an Instrument consists.

Plant

Plant or Animal, is no Instrumental Agent, because it acts not as an Instrument; but a principal Agent, because it acts as a principal Cause. Now that this Vertue cannot flow from any thing but the Soul implanted in the Seed shal be proved hereafter.

Chap. 6. *That the Seed hath the Soul in it, and that the Soul in the seed shapes the Living Body.*

That the Seed is animated.

ALL which things when the diligent Searchers of Nature had considered, and knew that al things which were made by Nature or Art were made by that which actually is, and that whatsoever moves ought to have an actual Being, nor were ignorant that a thing unanimated could not be the principal Cause of an animated Body, but that a thing animated was produced by that which is animated as the principal Cause, and that such noble actions they saw could not be attributed to an accident alone, not governed by the Soul, nor present therewith: they concluded rightly that the Seed it self is animated, and hath a Soul in it. Nor is this Opinion first sprung up in this Age; and therefore it is falsly traduced and opposed by some as a new Opinion: but the most excellent Philosophers and Physitians of al Ages have maintained the same; *Hippocrates*, *Lib. de Diæta*; Plato *in his Timæus*; Aristotle, 2. *de generat. animal. cap.* 1. & 3. (save that he saies the Mind comes from without) *Galen*, 1. *de sem. cap.* 7. & *Lib. de marasmo*, *cap.* 1. Themistius, 2. *de Anima*, *text.* 6. Philoponus, Zimara, 2. *de Anima*, *text.* 43. Jacobus Forolivienſis, 2. *in Art. Medic. quest.* 38. Jul. Cæs. Scaliger, *Exercitat.* 6. Cardanus, 2. *Contradict. tr.* 6. *Contrad.* 17. Argenterius *in Artem parvam*, *tit. de Temperam.* Thomas a Vega, *super Artem parvam*, *cap.* 47. Christoph. a Vega, *Art. med. Lib.* 1. *cap.* 3. Volcherus Coiter, *Lib.* 2. *controvers. cap.* 9. Zabarella, *de Animæ facult. cap.* 11. Mercatus, *Lib.* 1. *part.* 4. *class* 1. *quæst.* 98. Capivaccius, *Lib. de fœt. format.* Joubertus, *in cap.* 5. *Lib.* 1. *Galeni de facult. natural.* Archangelus Piccolhomineus, *Lib.* 1. *Prælect. Anatom. prælect.* 3. *Fortunius Licetus* every where in his Books *de spontaneo Viventium ortu.*

Authors who hold the seed to be animated.

And although (as was said before, Chap. 3.) Authors are here of two Opinions, whiles some say the Souls of al Living things are communicated by the Generators in the Seed, and others except the Humane Soul: yet it wil be sufficient if it can be proved in general of Plants and Animals; but whether or no the same Reasons hold good in the generation of Man, and whether the Generation of Man have any thing peculiar, we shal consider in the last place.

What is the Nature of the seed

And for our better proceeding we must first say somthing of the Nature of Seed, and that not as the common fashion is, of the Seed of Man, but in general of al Seed, inasmuch as Plants and Animals are propagated thereby. Touching the Nature indeed of Seed there are divers Opinions of Authors, and most hold that it is an Excrement. For they say that Seed being a thing according to Nature, is either a part of the Body, or an Aliment, or an Excrement of an Aliment. That it is no part properly so called, nor an Aliment of the Body, it is so manifest that there needs no enquiry thereabouts. Therefore they conceive it remains that it must be an Excrement. And therefore they say that the Seed is the remainder of that Blood which is distributed into al the parts of the Body, and can nourish al parts; and because it is voided forth they say it is an Excrement. But this reasoning offends against the Laws of Demonstration; since Seed is bred not only in Animals of Blood, but in Plants without Blood; and though the Seed which in Animals is voided forth may in some sort be called an Excrement, yet this does not betide al Seed, viz. the Seed of Plants. Moreover, the Seed of Animals is not only the superfluity of Blood, which therefore because it is superfluous (as the Menstruous Blood is an Excrement) it ought to be expelled, but by a primaty Intention of Nature, as a thing most necessary it is made of the best Blood by the Sperm-making Faculty. And therefore in the foregoing Argument there is an insufficient Enumeration, and besides the Part, the Aliment, the Excrement, there is a fourth, viz. the Fruit. For the Seed is the Fruit of a living Creature brought forth to that end that its like may thereby be engendred. And therefore *Epicurus* (as *Plutarch* hath it, *de Placitis Philosophor.*) called it an abstract of the Body and Soul, and as the Author of Medicinal definitions relates, *Zeno Citicus* defined the Seed after this manner. The Seed is the Abstract of a Man, and a Mixture of the Nature of his Progenitors, which a man transmits with the moist part of his Soul; being such a thing as that from whence it was voided. Yea, and the holy Scriptures teach, That the Earth by the Divine Benediction brought forth the Herb seeding Seed, the Fruit-tree bearing Fruit, and every thing having its seed in it self, according

according to its kind; where the Fruit and the Seed are one and the ſame thing. And if any man eſteem more of the Authority of *Ariſtotle* in this point than of the holy Scriptures, let him conſult with *Ariſtotle*, who in 1. *de Generat. Animal. cap.* 18. writes, That the Fruit is either the Seed, or that which contains the Seed in it. And ſince it is manifeſt in Plants, as alſo in Fiſhes and Birds, that the Seed is not ſimply an Excrement, but ſomwhat produced by the Generator, which hath its own peculiar Quantity, Figure, and Conformation; why ſhould the Seed be counted an Excrement in other Animals, although it be voided in a liquid and fluid Form; ſince the ſame proceeds from it which proceeds from the Seed of Plants, Fiſhes, and Birds.

But if you wil cal the Seed before it goes away and is ſeparated from the Generator a part of the Animal, you ſhal commit no abſurdity. For (which is chiefly manifeſt in Plants) it both cleaves unto the whol Body, and is informed by the ſame Soul whereby the whol Body is informed. Yet becauſe it is generated to that end, not that the Generator may be thereby conſtituted, but that it may be ſeparated from the whol, I conceive it may more fitly be called the Fruit.

What Seed is.

Seed therefore as it belongs to al living Bodies is a Body formed by the Generator, full of inbred heat, profitable to propagate any ſort of Soul; or, it is a Body produced by the Generator, out of which a living Body ariſes of the ſame ſort with that from whence it came. And indeed in the Seed of Plants that ſame innate Heat is in an Oyly and Fatty Form, and hardly in any part of the Plant is there more Oyl than in the Seed: which appears at leaſt hereby, in that from the Seeds of Plants a great quantity of Oyl may be ſtilled and preſſed; as is manifeſt in Line-ſeed, Poppy-ſeed, Hemp-ſeed, Juniper Berries, Almonds, and other ſuch like. In ſuch Animals as breed Eggs 'tis repreſented in the form of an Egg: in ſuch Creatures as bring forth live yong ones the innate Heat is in a ſpirituous form, and therefore it eaſily exhales and is diſſipated, unleſs it be preſently received or conceived by the Womb, and cheriſhed by the warmth thereof.

Here nevertheleſs it is to be obſerved that the name of Seed is taken, ſomtimes more largely, other whiles more ſtrictly. The Seed is largely taken for al that Body which ſerves for the propagation and generation of a living Creature. But ſtrictly taken it is a moſt ſimple ſubſtance, or a certain ſpirit in which the Soul and Formative Faculty is immediately ſeated, and containing in it ſelf the Idea or Model of that Organical Body from which it is taken, and therefore having in it the Power to Form a Body like to that from whence it was taken, and to perfect it ſelf into an Individual of the ſame ſort with the Generator.

Now the Seed conſiſts of two Subſtances, the Matter, and the Form. The Matter is that ſame Body or bulk of the Seed, which is various in different Creatures, and of another kind in Plants, and variouſly diſtinguiſhed by the admirable wiſdom of the Creator, according to the Nature of every ſort of living thing; of one faſhion in Fiſhes, another in Birds, another in other Animals. And that matter again conſiſts of two parts, of which one is a thick ſubſtance, another ſpiritual, or (as *Ariſtotle* ſaies) a Spirit and Nature anſwerable to the Element of the Stars. And the Spermatick Faculty is as the Form being the Original of motion, and which hath ſo great a power, that *Plutarch*, (*de Commun. Notionib.*) ſaies of the Seed, that it is more magnificent and great than that from whence it came, and of which it was bred; and that which *Ariſtotle* ſaies in general of Principles, 5. *de generat. Animal. cap.* 7. is chiefly true of the Seed, viz. That Principles though ſmal in bulk, yet are exceeding great in faculty and ability. Which power of the Seed *Seneca* alſo admires, *Lib.* 2. *Quæſt. nat. cap.* 6. *Let us conſider* (ſaies he) *what a mighty power ſmal Seeds do ſecretly put forth; and thoſe whoſe ſmalneſs doth hardly take up any room betwixt the joyning of two ſtones, they grow ſo ſtrong as to draw aſunder huge ſtones, and diſſolve the Monuments of the dead.* And *Gregory* the Great, in his 26. *Homily upon the Evangeliſts*, writes excellently of the wonderful nature of Seed: Behold! in one grain of the ſmalleſt Seed lies the whol bulk of the Tree that ſhal ſpring therefrom. For let us ſet before our eyes the greatneſs of a Tree, and think with our ſelves what original it had which is grown ſo great; we ſhal doubtleſs find its original to have been a ſmal Seed. And now let us conſider where (in ſo ſmal a grain) lies the ſtrength of the Wood, the roughneſs of the Bark, the greatneſs of the taſt and ſmel, the plenty of Fruits, the greenneſs of Leaves. For if you feel a grain of Seed it is not firm or hard, whence then comes the hardneſs of the Wood? it is not rough, whence then came the roughneſs of the Bark? it is not ſavory, whence then is the taſt of the Fruits? It hath no ſmel, and how then came the Fruits to be ſo fragrant? It hath no greenneſs in it, whence then proceed the greenneſs of the Leaves? All theſe therefore lie hid in the Seed as

one and the same time; yet are they not produced out of the Seed al at once. For out of the Seed the Root is produced; out of the Root sprouts a Branch, out of the Branch grows Fruit, and out of the Fruit is produced Seed again. Let us therefore ad that the Seed also lies hid in the Seed.

Hence therefore some do not unfitly term the Souls Idea's or Patterns, because in them as in a Prototype, the Nature and Fabrick of al Visible Bodies which they form and shape, and of al accidents which they produce in their Bodies, is comprehended.

But that the Principal part of the Seed is the Soul, and that therefore the Seed is animated, shal be anon proved by firm Arguments, wherewith a mind desirous of Truth may be satisfied. But because I see that most men now adaies do not regard so much what is true as what is old, it were worth the while to alleadg the Authorities of ancient Philosophers and Physitians; but we have done that already in the beginning of this Chapter. Also the Authorities of Divines (both Greek and Latins) might be produced; but because most of them speak only of the Soul of Man, of which we shal speak hereafter, it shal suffice in this place to alleadg only the Authority of *Aristotle*, who 2. *de Generat. Animal. c.* 1. thus writes: *All things whatever are made by Nature or by Art are made by that which is actually out of that which is potentially such or such. The Seed therefore is such a thing as hath such a Motion and Principle in it self that the motion being finished every part exists, and each part also is animated.* And in 2. *Phys cap.* 3. *text.* 31. *The Seed, and the Physitian, and he that advises with him, and every Efficient, are all of them Causes, whence there is a Principle of Mutation, Rest, or Motion.* And more such like places *Scaliger* produces, *Exercit.* 6 *Sect.* 7. Also consider what follows, out of which it manifestly appears that though *Aristotle* saies the Soul is potentially in the Seed, yet that he holds it is really there. Which appears by the example of a Geometrician sleeping, waking, contemplating, which he makes use of. For as the Geometrician sleeping and waking hath the power to contemplate, the former a remote power, the latter a neerer power, each of which notwithstanding presupposes an Act, such as is not in al men, but only in a Geometrician; so in a Tree (for examples sake) in the Winter time when it grows not there is a neer power to grow, because it hath Organs necessary to cause it to grow already perfect: but in the Seed there is a remote power, because it is as yet destitute of Organs; yet each power pre-supposes an act, and neither the Seed nor the Tree could be called potentially such, unless the Soul were present.

What Soul is in the Seed.

But it is demanded, What Soul is in the Seed? *Aristotle* indeed saies, That the Generation of a living thing is the participation of the first Nutritive Soul with the inbred heat. And in 2. *de generat. animal. cap.* 3. he writes, That a Man lives first the life of a Plant, then of an Animal, and lastly of a Man. But this is not so to be understood as if three Souls came at distinct times. For every living thing (even according to *Aristotle*) hath but one Soul, whereby it is that which it is. And therfore in al seed whatever there is presently the whol Soul, which nevertheless does at first form the Instruments necessary for Nutrition; which because it is chiefly and almost only conspicuous in Plants; a man is said to live first the life of a Plant. Afterwards in process of time the Instruments both of Sense and Motion are formed in Animals; which being perfected, a Man is then said to live the life of an Animal, and of a Man. For neither (as I also shewed in *Lib.* 6. *Physicæ, cap.* 1.) the Vegetative and Sensitive, or the Vegetative, Sensitive, and Rational, are peculiar and general Forms or three Essences, but only general Conceptions arising and constituted from the comparison and agreement of living things, which exist no where separated save in the Mind of Man; nor is the Nature of any Plant perfected only by the Vegetative Faculty, but every Plant hath a specifick Form, endued with a vegetative power indeed, but yet with other Faculties also.

This Opinion of *Aristotle* (and indeed the very Truth) concerning the presence of the Soul in the Seed most excellent Philosophers and Physitians of al Ages have acknowledged, whom I cited in the beginning of this Chapter, and especially *Julius Cæsar Scaliger*, *Exercit.* 6. *Sect.* 7. *et sequent*, and amongst later Writers, the most learned *Fortunius Licetus*, (who as elsewhere, so in *Lib.* 4. *de spont. vivent. ortu, cap.* 32. propounding as it were the Sum of what he had taught elswhere) writes, That the Seed is an imperfect Animal, and that a Lyon and the Seed of a Lyon are Univocals, and have the same Soul for their Essential Form, and differ only in the Organization of their Bodies; and *Lib.* 1. *cap.* 74. That the Father then truly generates when he casts out his Seed, his Soul being parted by partition of its subject, and of one being made two; and that which remains in the Seed being cherished by the temper of the Womb and obtaining a fit matter exercises its Faculties thereupon,

upon, and forms it self a body fitted with those Organs it stands in need of, to perform the other operations of life: so that the seed is an Animal and living, only wanting a multitude of Organs; and the Fathers generation is not performed in the Womb after the Fathers's death, but when he issues out his Seed.

'Tis proved that Seed is animated.

But I will not contend only by Authorities, nor is it fitting to begin the proof of this point from the Generation of Man, since that were contrary to the Laws of demonstration. For some do not a little involve this point with obscurities, when they dispute whether the seed be animated, not sufficiently explaining their mind, whether they understand the Seed of Man, of brute Beasts, or of Plants; [or when they cannot satisfie themselves, but remain doubtful, they affect obscurity on purpose that others may not easily understand what they think. Lest therefore any doubt may remain in a matter so serious, by a Living thing we understand a substance wherein there is a Soul actually, and our Question is whether the seed be such a substance] which they ought by any means to have declared. For there are some who will not grant that any seed is actually animated; others that the seeds of Plants indeed are animated, but they deny the seed of animals especially of Man to be actually animated. But I conceive it most probable that all seed is animated. And therefore we undertake to prove in general concerning all living things, that their seeds are animated. Now those most evident and firm and hitherto unanswered reasons which have induced most renowned Men to be of this Opinion, are these. The first is this, that the operations of the soul are most manifestly discerned in the seed. For it is a maxim granted by all Philosophers; every thing that moves is actually in Being. And these three follow one another reciprocally; to be, to be able, to operate. And therefore Operations bring us to a power, and a power to an Essence. For such powers do flow from the very Essence of the soul, and they are inseparable from the soul, nor do they pass from one subject to another. And as *Plenius* speaks well, it is so absurd as nothing can be imagined more absurd, to hold that conformation, as also nutrition and augmentation, which begin with the soul it self, do flow from a Principle which is not not vital. Not can a vital power communicate its Virtue to another thing which is not vital. Since therefore the operations of the soul appear in the seed, we do thence rightly and necessarily conclude, that there is therein a soul furnished with the powers to exercise these operations. Now that the seed hath Motion and Action is as manifest as that which is most manifest, and so often inculcated by *Aristotle*, when he calls the seed the Beginning of generation and Motion (1. *de generat. Animal.* 2. & 21.) and the Beginning of the Form or Species, which works the Menstrual Blood into its own proper shape. 1. *De generat.* 20. and 4. *de generat.* 1.

The Operations of the Seed.

The first Principation.

Now these are two operations in the seed which bring us most certainly to the knowledg of the soul lying hid, viz. The quickenning of the seed and Conception; and afterwards the shaping of all the parts necessary for the performance of the vital actions. For in the first place, every seed (as is manifest in Plants) is preserved by its own soul, and for a certain season remains fruitful, some the space of a year, others two years or more according to the difference of sorts; and as long as it is perfect and uncorrupted, and hath gotten a fitting place, present nutriment and external heat to excite the same, it is apt to grow up into a Plant of its own kind. It seems indeed an absurdity to *Libavius* and some others, that grains of Wheat lying in the Corn-loft should actually live, but he shews no reason why it should be absurd. Contrarily it is more agreeable to reason that seeds should live. For although in the seeds of Plants there is no motion apparent to the sense: yet the soul lying hid within is not idle, but it vivifies the seed: after the same manner as in Trees in the Winter time no action appears to sense, and yet they are not destitute of their soul, but are enlivened by the same concealed within them, which in the spring time by manifest actions does again discover it self; and the same happens in seeds. For Seeds whiles they live are fruitful and fit to be sowed, but those which are dead are not fit to be sowed, nor will any Plant spring from them. And if seeds were not alive, whence comes it to pass I pray you that being only mortified and cherished by Heat they presently begin to sprout?

The Second, the shaping of the Body.

The second operation is the forming and shaping of the living Body: an admirable work truly, and wherein as (*Galen* speaks) there appears the greatest Art and Wisdom imaginable. For if there be any work in nature admirable, and wherein we must be fain to acknowledg our own Ignorance and to admire the infinite Wisdom and Power of the Creator, it is the shaping of the Child in the Womb, the Chick in the Egg, and the Body of a Plant out of the seed thereof. For who does not admire that the Bodies of Plants and Animals are so artificially framed, and in respect of Magnitude, Number, Figure, Order, Situation, Colour, Smel, and other things, so formed, as to transcend all the Art and Industry of all the Artificers

in the World? *Hippocrates* truly every where, especially in *Lib. de Alimentis, de Corde, de Articulis, in epidemiis*, cals Nature most Sagacious, most Just, most Artful, most Provident, most Discreet. *Aristotle* compares her to a prudent Houſ-holder rightly mannaging all things, who in generation makes nothing superfluous, nor omits any thing necessary, changes nothing, nor produces any thing sooner or later than need requires, does nothing in vain; so that there is no member in a living body but hath its action, nor is there any action which wants its member or Instrument. And 1. *de part. Animal. ch.* last, he admires the Wisdom and Power of Nature even in the meanest things. *Galen* also in his 16. *de Usu partium, ch.* 1. does teach that distributive justice is in nature very eminent, and in 15. *de Usu partium, chap.* 1. that Mans words cannot express the wisdom of Nature; and in the same Book, *ch.* 7. he saies that Nature is more skilful than the skilfullest Artist. Which in 17. *de Usu partium, cap.* 6. he proves by example of *Phidias*, who though he had with such admirable workmanship engraven in a Ring *Phaeton* in his Chariot with four Horses, that the parts of the four Horses might be discerned distinct one from another, and the sixteen Feet of the Horses were visible: yet the workmanship of nature in the Thigh of a Gnat is more admirable than that of *Phidias*, in all those members of the four Horses. For besides the Articulation, there is found therein a faculty to move, nouriſh, and grow. And how great the Wisdom and Power of Nature is, even a Plant the loweſt sort of living things does sufficiently shew; in which there is so much variety and beauty, in figure, colour, scituation, that no man can sufficiently admire, much less imitate the same. And from the Praises of Nature *Galen* fitly raises himself in many places to praise the God of Nature; and no Philosopher is more large in setting forth the praise of God, and all his Books of the use of the Parts of the Body (*as himself saies*) are nothing but an Hymne in Praise of the Admirable works of God. But especially *Lib.* 3 *de Usu part. cap.* 10. he writes excellently indeed; *But truly* (saies he) *if I should speak any more of these kind of Cattel, men better minded might justly be offended at me perhaps, and say that I defiled that sacred discourse which I frame as a true Hymne in praise of our Maker, and I conceive that herein is true Piety, not to Sacrifice to him many hundreds of Oxen, or to burn* Cassia Lignea *and a thousand other sweet perfumes and Oyntments, But if I first know my self, and then declare to others what his Wisdom is, his Virtue and Goodness. For in that he would adorn all things with convenient furniture, and suffer nothing to be deprived of his benefits that I count as a token of most perfect Goodness; and in this respect his Goodness must be celebrated by us with Hymnes. But to have invented all this, how and after what manner every thing should be adorned, is a point of the highest Wisdom; and to have been able to bring to pass al that he pleased, is an argument of an invincible and unconquerable Virtue and Power. Thou must not therefore so admire the Sun, Moon, and universal order of the other Stars, being so exceeding artificially marshalled & disposed; nor let their Greatness, Beauty, perpetual Motion, or so certainly described Circuits render thee so astonished as to think these sublunary things mean in comparison, and void of all ornament. For here also you shal find a like Wisdom, Power, and Providence. For do but consider the matter whereof every thing is made, and do not vainly perswade thy self, that of menstrual Blood and Seed an immortal Creature could be made, or one that is impassibble, or alwaies movable, or as bright and fair as the Sun. But as you estimate the Art of* Phidias, *so consider the Art of the Maker of all things. But you may perhaps be astonished at the wonderful Ornaments of the Statue of* Jupiter Olympius, *the bright Ivory, the store of Gold, the largeness of the whol Image. But if you should see such an one of Clay, you wil pass by the same it may be with contempt. But so wil not an Artist do nor one that is able to judg of the works of Art, but he praises* Phidias *as much, if he see his workmanship in common Wood, or Wax, or Clay. For a vulgar and unskilful Eye is astonished at the richness of the matter, but an Artist is only amazed at the Beauty of the workmanship. Come on therefore, be thou a skilful Naturalist, that we may not term thee a rude Plebeian but a true Philosopher. Leave the difference of matters, and consider the bare Art it self. When thou observest the Fabrick of the Eye, think that it is the Instrument of Seeing, and when thou viewest the Foot, think that it is the Organ of Walking. But if thou thinkest of Eyes made of the substance of the Sun, and of Feet made of pure Gold, thou forgettest the matter which is Bones, and Skin, and Flesh, whereof they are made. Remembring that therefore consider whether light be an Heavenly Substance, or an Earthly Slime: for so give me leave to call the Mothers Blood flowing into the Womb. As therefore if you give* Phidias *Clay to make an Image of, you wil never require of him an Ivory Statue; after the same manner having given Blood to the Work-master, you cannot receive from him a Sun, or a Moon, or such a bright and beautiful Body. For those Bodies are divine and Heavenly, and we but Statues or Images of Clay, and yet the Art of the Work-master is equal in both.* So far *Galen.*

Galen *sings an Hymne to God the Creator.*

Yea

Yea, and this Work can hardly be sufficiently admired, concerning which *Franciscus Titelmannus* writes excellently and piously, *Lib.* 8. *Physic. c.* 11. (I will give you the whol place) and thus he saies. *Is it not superadmirable that of a smal Seed (taken from some Herb or Tree) cast into the Earth, a green Herb should spring up, or a Tree, and that the same in proceß of time drawing its nourishment out of the bowels of the Earth should joyn to it self its just quantity, and fit all its parts according to the condition of its own Nature, with so beautiful a variety, so comely a disposition, and so admirable an order that the wit of Man is not able to comprehend the Workmanship that is in one smal Herb? For consider as a Tree grows up from the Seed, how it sends its Roots into the Earth beneath, and fixes them so fast, makes them stick so close in the bowels of the Earth that after a little time it can hardly be stirred or plucked up without great violence; how it sends its Stock and Trunk upwards, which outwardly it cloaths with Bark as with a Coat, against the inclemency of the Air, and the injuries of cold and heat. And in the inmost part the marrow is placed, and round about Veins great and smal are dispersed through the body of the whol Trunk; and they in an admirable order springing, the lesser from the greater, through which all parts draw nourishment to themselves. And in the upper part how wonderfully do the Leaves spring out of the Branches, wherein also we behold a wonderful Connexion of Veins and Arteries. Also the Leaves have all the same shape, the same smoothneß or roughneß, a like longitude and latitude well-neer, the same color, tast, and smel; and in every respect Trees of the same kind are exceedingly one like another. I pass over the beauty of the Flowers, the sweetneß of the Fruits, and in both a wonderful Artifice. And all these Originally spring from the Vertue of one Seed. And in the Seed likewise of a living thing, and consequently of a Man (out of which the Child grows as to its Body) is not that alone exceeding wonderful, that by reason of the Vertue which is in so exceeding vile altogether deformed and filthy matter, such a decency of Members, so beautiful a composition, so convenient an order, so effectual a disposition of Members, so rare a conjunction of parts should arise? namely, That beneath a broad part should be shaped upon which the whol body might firmly stand, and move from place to place; the extream part whereof should have a manifold division, so that the matter should be carved as it were into particles, viz. That the Feet should have Toes, and that these parts again should have such an order that that which is in the first place should be longer and thicker than the rest, and so to proceed gradually, as that the last Toe is of all the smalleß and the shorteß. Likewise, That these parts at the end of the foot should be so regularly and generally five in number, that he is counted for a Monster that hath six. Also that each of these parts hath its joynts wherein they may be bowed, and the first and greateß hath only one joynt in the middle, the reß every one two. And all these things are manifestly apparent in the composition of the Foot and Hand to him that shall look no further than the out side. And in the uppermoß Part of the Body, how there is framed with rare Artifice a round part, which is covered above with the Skull, of so hard and indissolvable a boney substance that lying many yeers together in the Earth it cannot be consumed. Which Skul is covered with fleßh and skin, whence flow the Hairs which cloath the part all over. But under this Skul is formed a certain noble and moßt tender substance which we term the Brain, and that in several parts variously formed that it might be a fit receptacle for divers Vertues, and the Organ of sundry noble Operations. In which upper round part the Eyes also are placed, beautifully formed in their sockets, yet so as they might be moßt readily moved, which also have their Eyelids and Eyebrows. Under these the Noßrils, and on the sides the Ears; and under the Noßrils the Mouth-hole to receive the Meat, and round about the Jaw-bones ful of Teeth; the foremoßt of which at the entrance are thin and sharp to cut and mince the Meat, but the hinder are more than twice as thick, which like Mill-stones grind what the other hath cut into smal particles, in which regard they are also called Grinders. But on the back-side of the Head all is shut up, and no opening to be seen: but there are strong Nerves, and wonderful Joynts which faßten the Head (the upmoßt part) to the Shoulders beneath, so that though the Head do not touch the Shoulders, yet it is beautifully supported by them without burden by interposition of the Neck. And hence from the Shoulders (as it were two Boughs) the Arms are stretched out for the performance of any work, which in the middeß (namely the Elbow) are made to bend, and have their utmoßt parts orderly divided into Fingers, as was said before of the Feet. Moreover that same moßt noble member the Heart is so wonderfully seated in the middeß of the Body, having the Lungs placed round about to fan and temper its heat, drawing the Air continually in by their respiration like a pair of Bellows, and so tempering its Heat: also having the*

Liver

Liver its neighbor the Work-house of Blood, and the Stomach as the Cook of the whol Body, receiving the Nourishment of the whol: also the Spleen, the Kidneys, the Guts, all wonderfully knit together and rowled about. That all these things, I say, which we have only touched at, and other things hid within much more wonderful, should be so orderly, so perpetually shaped in the Body of a Man, yea, or of another Creature, by the power and vertue of so vile a substance as the Seed, who can chuse but count this the greatest miracle in the World? Had not the Psalmist reason to say to the O Lord, thy Knowledg is made wonderful in me, and strengthened, and I cannot attain thereunto? And have not we like reason in the Preface of this Book to cry that Men carry Miracles alwaies about them more wonderful than all the Miracles in the World besides? And truly it would not seem so great a wonder if we should ever, That God by his Omnipotent Power of himself did frame all this connexion and disposition of Members which we see in our selves. If as in the beginning he created Adam of the Earth, and Eve of his Rib without the power of any seed, to imp body the Earth for matter, and administring all the power himself; so he himself also should frame our bodies in their most beautiful disposition and proportion. Also, if as at the first he created Trees and Herbs without the Vertue of any seed; so he should now by his all-powerful Command cause them to spring up out of the Earth. For we know that to him nothing is impossible, and nothing difficult. It is to us no news if he does great things, or without resistion; He alone does wonderful things. But that this disposition of the Body of Man should proceed from the Vertue and Power which lies hid in the Paremt seed (a most filthy, and hardly to be named substance, which no man beholds without abomination) and that therein so rare a vertue should lie concealed to make and shape so admirable a body; that the whol efficacy of this wonderful disposition of parts should really exist therein, this justly adds weight unto our consideration above measure, this renders us amazed and astonished, and compels us to cry out, and to confess with open mouth, that he is not only great in himself, nor only great in great things, but that even in the most abject, contemptible, and smallest things, he is full of Glory. So far *Thelmannus.*

The shaping of the Body of a live Creature is the work of the Soul.

But since certain it is, That God does not immediately and alone effect al these things which come to pass in the Generation of Living things, but that Nature is constituted, which is the ordinary Power of God, and which performs al the vicissitudes of Generations; the Question now is, What is the immediate Author of this admirable Fabrick in living things, both Plants and Animals. And although *Galen* despaired to find the cause by which al these things are done, and confesses that he could find nothing so much as probable in this point, which made him exceeding sad, *Lib. de fœtu formato, cap.* 6. Yet if he had considered that these Operations were proper to the Soul of every sort of living Creature, he might without great difficulty have known that al these operations did proceed from the Soul which lies hid in the Seed.

That these are the Operations of nothing but the Soul of every living thing, he will easily understand who considers what it is which of a smal Birth makes a large Animal, preserves in Nutrition the same Figure of the Body, left by the continual growth of the parts it should be changed, restores the flesh lost, breeds oftentimes large Veins. Which *Galen* saies he saw in the Head of one, *Lib. de semine*, repairs the teeth which young people do cast, restores every year the fallen Leaves of Trees, brings forth the Flowers and Fruit, in Peacocks and other Birds supplies new Feathers suitable to their kinds. For since it is certain, that the Soul and form of every sort of living thing is the specifick cause of al these operations, and that hence every year each Tree hath its own Leaves restored, of one fashion to the Oak, of another to the Pear-tree, of another to the Peach-tree, and Harts-horns to the Hart in room of those are fallen off, but not the Horns of an Ox, Claws of a Crab, every one according as suits with their particular Nature: What need is there I pray you in the first structure of every living thing out of its Seed, to seek any other cause of Formation than the Soul it self, which is one and the same in the Seed, and in the living body formed? For it is altogether the same work, when the Soul lying hid in the Seed, and drawing matter, shapes the body of a Plant, and when the same Soul repairs the fallen Leaves, restores the Flowers, produces new branches, boughs, and roots. And so since the same operations in the Seed, and in the Plant, are seen in every respect absolutely perfect, they shew that there is the same Principle and Agent in both. And therefore since in the seed it self are performed the operations proper to the soul, why should we deny the soul to be in the seed? For al the faculties of every form, and especially of the soul, are properties inseparably flowing therefrom, and therefore it may be most rightly concluded; Where the faculties and operations of the Soul are found,

there

there the Soul also it self is present, and we easily come by the operations to the knowledg of the hidden Essence and Soul. For if one Faculty were in the Seed, another in the grown body, of what form was that the power, or when went it away, and whither, when the body was formed? It is an absurd thing truly to hold, that the Formation of the Flesh, Membranes, Bones, and other parts, is begun by one faculty, and continued and perfected by another different therefrom; and that so as to continue the work begun with the same thred without any Error. Doubtless one and the same continued Operation, which lasts from the Beginning of Generation to the end of Life, cannot proceed from divers Principles.

This also confirms the same that in Plants we see a Root, or Branch, or also a Leaf only, as in the Indian Fig-tree, being pluckt from the Plant and stuck in the ground, does grow into a compleat and perfect Plant; which is the work of nothing but the Soul present therein. And since the same thing is done in the Seed, we justly conclude that the Soul is present and therein, and performs the same work. Yea, and when we see the same Plant (as Rosemary for example) propagated both from a Seed and Branch we acknowledg the same cause in both cases. For otherwise there would be two different causes of one special effect, and two conforming Faculties of one and the same Plant, which is false and absurd.

To answer this Argument, *Fienus* (truly) labors and sweats hard, *de form. fœt. quæst. 5. Concluf. 6.* but yet in vain. For he saies that a new Plant is produced one way out of the Root and Branches, another way out of the Seed. For of the former a new Plant is not made, but they being severed from their stem are themselves a new Plant; because being cut from the whol they have already a vegetative soul multiplied, but do not acquire the same, by which they augment themselves and attain to their perfection. Contrariwise, that the Seed is no new Plant, because it hath no soul, but it becomes a new Plant by the coming of a soul into it after it is planted in the Earth; or by the soul which is newly produced in the seed after it is put into the Earth.

Fienus his Reason against the Animation of the seed of Plants.

But *Fienus* can by no means thus free himself. For in the first place, though it seem another manner of propagation to the sense, that which is by the Root or Branch, from that which is by the Seed: yet in respect of the principal Efficient it is indeed one and the same, since it proceeds from the same soul. *Fienus* denies indeed (by reason of a pre-conceived Opinion) that the soul of the Plant is in the seed, but he proves it by no reason. Contrariwise, from the operations of the Formative Faculty which are in both alike we firmly conclude the same soul to be in both, viz. in the Seed (for examples sake of Rosemary) and in the Branch thereof. Moreover in the same sence, as a Root, a Branch or a Leaf may be called a new Plant, the Seed may also be so called. For in each there is its Soul, but in the Seed there is wanting the ultimate perfection springing from the Organs. Thirdly, if he grants the whol soul may be in the Slip of a Root, and in one Leaf of a Tree, and that by cutting off the soul is multiplied, and that the soul which before was but one in number, viz. while the said Root, or Branch, or Leaf did grow to the Plant, by cutting the same off is multiplied; why does he not grant that the same multiplication may be made by the seed? especially since al seeds are rarely fashioned, and some of them have a more artificial shape than the Root of an Hop or any other Plant, or the Leaf of an Indian Fig-tree? The same Operations in both do argue (doubtless) the presence of the same Soul in both.

We do therefore rightly argue from this wonderful Fabrick of the Body which is made in and of the seed, that the soul is present therein. For, *whatsoever is made by Nature or by Art must be made by that which hath an actual Being; and that which moves must have an actual Being*; and every immediate efficient Cause must necessarily be joyned with the Patient. And therefore in the generation also of al living things that which forms the Body must be present, and must be joyned to that Body. And that which is yet more, the ministring powers themselves which wait upon the Formative Faculty do al appear in the seed. For the first Operation which is performed in the Seed is in a Plant the drawing of nourishment from the Earth, and in Animals the drawing of the Mothers blood. The second is the Vivification and Animation thereof, or Communication of the Soul thereto. For the Nutriment drawn out of the Earth is inanimate, and the blood also is of it self inanimate. But when of these the parts of a Plant and of a Child are made, they must needs then be animated. But nothing can give a Soul but that which hath it, and therfore the Seed is animated. The third Operation is the separative. Since the Liver is made of one kind of matter, the Stomach of another, the Heart of another, the Brain of another; a Vein, a Nerve, an Artery of another, the Soul in the Seed discerns and separates these matters one from another.

Fourthly,

Fourthly, when these matters are severed by the same Soul each is put in its own place, the Brain and Stomach in one place, the Heart and Liver in another. The first is the Formative peculiarly so called, by which its own shape, quantity, number, and the like, are allotted to each part.

There is no Agent in the seed except the soul.

Secondly, There can be no other Agent here assigned save the seed. For first of al, the Generator himself is many times absent. So in the Spring, when a Plant springs from seed, the Plant which bare that seed is many times dead long before; and while the Animal is in the Womb of the female receiving its shape, the Male which ingendred the same may happen to be dead.

The innate Heat in the Seed is not the Principle of conformation.

Again, Neither can the inbred Heat of the Seed be the Cause of Formation. For though it cannot be denied, that the innate Heat is an Organ wherewith as other actions in the body, so conformation is shaped, yet it is not the primary Cause; since so admirable a work can not be ascribed to a bare quality, as to give to so many different parts almost infinite in number, each its peculiar figure, quantity, number, scituation; but there is need of a far Diviner Agent. Of which *Scaliger*, *Exercitat.* 6. *Sect.* 5. *If* (saies he) *the form comes from without (as they tel us) and in the mean while the matter is furnished with al kinds of perfection; of necessity both the Qualities and Quantities, the numbers, orders, and scituations, must be provided and ordered by somwhat which is within, and in conclusion the whol Body must be shaped by the same internal Principle. Now this shaping of the body is performed, either by a substance, or by an accident, or by both. Not by an accident alone. First of all, because no accident works but in the vertue of its substance. Again, because no accident hath knowledg. But that same Vertue and Power which is Architect of so noble a Temple hath been judged by all Philosophers to be most exceeding wise. It must be therefore framed and built by a substance. And this substance is the Form of the Seed. Doubtless the form of the Seed if it be not a Soul it is a bruit thing: and if it frame the body, it is equal to the Soul. But in growing and restoring of wasted Flesh the soul is it which does all. There must be therefore in the Seed a shaping Soul which comes before that Soul for which it prepares its house. And therefore that former Soul is more wise and noble than this latter.* And a little before: *The Form it self is the cause of this preparation. For it both alters the whol, and disposes of the parts for its own use. Nor when the body arrives to the perfection of its preparation, does it then also arrive to the substantial Form. For the Form it self exists before-hand. And therefore there is no progress made to it, but to its act, that there may afterwards be use made thereof.*

The vertue of the Mothers Womb is not the Cause of the formation of the yong one.

Nor in Animals can the Vertue of the Mothers Womb be the cause of the Conformation and shaping of the Body. For if the Formative Faculty were in the Womb, and not in the Seed, the Father should confer nothing to the Conformation of the yong one, and should afford only a passive Principle, and consequently should not generate. Again, there can be no cause assigned why the Child should be sometimes like the Father, and why Females should not alwaies be ingendred. Thirdly, in Eg-bearing Animals the Conformation is not performed by the Womb, but the Eggs are perfected into Chicken, without the Body of the Hen; as neither the Earth (which to Plants is as the Womb) hath any power to shape the Plant, but al that Faculty is in the Seed. Moreover, if heat brings (as they say) the power of the Seed into act, a Quality engenders a substance. Nor can they avoid the force of this Argument who answer, That this substantial Power is so ordered and disposed by the Generator, that the said Quality being awakened it breaks forth into an act like the Generator. For what I pray you is that substantial power? Certainly unless it be the Soul it is a meer figment, which appears by their own rule, when they say that the next power is reckoned for an act. For since a thing cannot be at once both in act and power, if the next power be an act, certainly it cannot be a pure passive power, but a formal one, and so the Soul it self.

The Objection of Fienus against the presence of the soul in the seed.

Nor is that of any moment which *Thomas Fienus* brings against this argument, *de form. fœtus, quæst.* 5. *concluf.* 6. For seeing he grants that there is no other cause of the Conformation of an animate Body save the Soul, it is rightly hence concluded; That whatever hath in it the Efficient Cause of Formation hath in it the Soul: But the seed hath in it the cause of the Conformation of an animate Body. *Ergo* it hath in it the Soul. Here indeed *Fienus* answers; *I acknowledg the Premises are true; but I deny the Consequence. It is indeed rightly inferred that there is some Soul in the Seed, but not that it is the Soul of the Seed. There is indeed a Soul brought in to the Seed after that the Seed is conceived in the Womb, or planted in the Earth, or the Eg is set under the Hen, when al things are put into act; but*

that

that is not the Soul of the Seed, or which did pre-exist in the Seed, or which was bred in the Stones, the Tree, or the Hen, but the Soul of the young Conception which was afterward introduced thereinto. But in very good deed, how can the Consequent be denied if both the Premises be true? For in a Syllogism, that which is false cannot be inferred from true Premises. He saies nevertheless that the Minor is false, and he denies that the soul which is the Cause of Conformation is the soul of the seed: but falsely. For it must be shewed, as hereafter shal be said, what is the cause of those operations and of the conformation in the seed before the soul is come, according to his opinion. Moreover since he saies the soul is not present til all things be actuated, he ought to shew what is the Author of that same actuation and conformation, in Plants, Eggs, Bruit Beasts, before the soul comes. Thirdly he ought to have told us, whether the Souls also of Plants, Birds, and Beasts, are introduced, and from what cause they proceed. Doubtless when some Seed is cast into the Earth, or in any place is moistened with water (without any other cause) first it puts forth a Root, and a little after it begins to sprout. What I pray you is the cause of this operation and formation, save the Soul already pre-existent in the Seed? Or if it be not the Soul pre-existent in the Seed, Let *Fienus* shew whence it should afterwards come.

And this Argument which hath hitherto been propounded and explained, drawn from the operations of the Soul appearing in the Seed might alone suffice to perswade a mind not pertinacious, but desirous of truth, that the Soul is in the Seed: howbeit there are other Arguments evident enough to prove the same.

Like would not beget its like, if the Seed were not animated.

For in the second place, whatsoever ingenders its like must needs communicate its Essence to the thing ingendred; otherwise it would not be essentially like it. But every living Creature begets its like, *Ergo* it communicates its Essence to the thing ingendred; and consequently not only the matter, but also the form, whereby the Essence of a thing is chiefly accomplished. And if this were not so there could be no univocal Generation, and the Generator could give nothing but the matter, nor could any man tel us whence the Soul should come; when frequently the Generator before a Plant or Animal is made of the Seed may come to die, and afterward nothing should be found to form the Plant or Animal save external Heat. Thus the Seeds and bulbous Roots of Plants are sometimes kept many yeers before any Plant grow therefrom, the Plant which bare the Seed or Bulb being long since dead. So out of an Egg even by the Heat of a Furnace a Chick is hatched, the Cock and Hen from whose copulation the Egg proceeded, being long since kil'd and eaten. And questionless if there were not in the Seed an active Principle communicated by the Parents, the Parents could not be truly said to generate, since they should afford only the Matter.

Thomas Fienus indeed makes answer, *de Format. Fœt. quæst.* 6. that the Parents do herein really and actively generate, in that they afford the Seed and Matter of Generation, and imprint thereupon all dispositions necessary for the Introduction of a Soul. But this is the Begging of the Question. For we deny that *that* which only affords the matter of Generation however disposed to fit it for the reception of the form, does communicate an active principle and truly Generate. For all these dispositions do belong to the matter, and he that does not communicate the principle of acting, he cannot be said actively to ingender.

A Thing Inanimate cannot ingender that which is Animate.

Thirdly, If the Seed had no Soul in it, and yet should produce a Creature with a Soul in it, the more noble should be produced by the less noble, and the Virtue of the Seed should produce a Substance, which is absurd. For nothing acts beyond its ability; also that which is not animated should perform actions proper to the Soul, Conformation, Nutrition, Auction, Attraction; should make Bones, Flesh, Membranes: all which actions are performed at the first conformation, which happens soon after the Beginning of the Conception.

And though it be objected by some, that an Agent by virtue of another thing may produce an effect more noble than of it self it were able to compass: yet if this be done, it must be done when the principal Agent is present, and not when it is absent, which does not happen in generation. For the Father may be absent from the place where Generation is made, yea and he may be dead before that time. So also the Mother may be absent or dead, as it happens in Chickens, which are hatched by the Heat of a Furnace, or by some Fowl of another sort.

How Live things are generated.

All the Premises therefore being considered, it is most rightly determined, that the soul it self is in the seed, and as *Zabarella* wel saies *de Facult. Anim. cap.* 11. that Living things when they generate their like do communicate some of their Matter and some of their Form, when they afford an animated seed furnished with the same vital faculty which was in the Generator.

Souls are co-extended with their Bodise.

For though the Souls of living things of themselves have no Quantity nor are divisible: yet according to the extension of the matter wherein they are they themselves are extended, which *Fortunius Licetus* hath proved in two Book *de Animæ Coextensione Corpori*, and when it is divided they are divided, or rather multiplied, and yet they themselves are neither greater nor less than they were. So the Soul which is in a smal Twig that first shoots out of the Earth, is no less than that which is afterward in a tall Oak; nor is the Soul of a Calf less than that of an Ox. After the same manner the Soul diffuses it self into the Nutriment which is newly adjoyned to the Body, and so according to the extension of the Body which it informs it self is extended, and yet becomes not greater than it was: as on the Contrary, when a Branch is pluckt from a Tree, the Soul of the Tree is not made less than it was. After the same manner it is in Generation. For whereas before a Plant generates the soul is but one in number, because it is but in one subject: yet now that the Plant generates seed, viz. such a matter as wherein the soul which was before in one numerical subject may now be multiplied in its existence; & that Seed being ripe is separated from the Plant: in each seed though never so smal the soul remains entire, and now it lives by its own soul and subsists by it self; and since of one Plant of Poppy more than an hundred seeds are bred, the same soul of the Poppy exists entire in each seed; and then the Soul is said to multiply it self: which when it doth, it becomes no lesser than it was; since of it self it hath no Quantity.

How the Soul multiplies it self.

But which way the soul it self remaining entire can communicate its Essence to another, this is that which hath perplexed great Wits, and not being understood hath raised many disputes and bred many Errors. For *Jul. Cæsar Scaliger* saies rightly concerning the Soul, *Exercit.* 307. *sect.* 29. *We see the shallowness of our Understandings. Who dares say he comprehends the species of substances? We cannot attain to that exquisite knowledg, how of two things one is made; how the Form is totally in the whol Body, and totally in every part. So divine a thing is the Form, that being a substance it fils another substance ful of it self, so that of both one is made. Therefore to enquire further is the part of an over curious and busie mind; for it is a part of humane Wisdome to be contentedly ignorant of some things.*

Whether the soul be divisible.

But chiefly that question hath much troubled many, whether the Soul be totally in the whol Body, and totally in every part thereof: also how the Soul is divisible, whether in regard of its extension by means of the Body. Where some hold that all the Souls of perfect Animals (and they only) are indivisible and unextended: others hold that all the souls of perfect Animals are divisible and extended, only the rational Soul of man excepted. But the Conimbricensian Collegiates do hold both these Opinions to be very probable, and therefore they answer the Arguments brought to prove both, and so leave the Reader unresolved: yet they confess they had rather maintain the former. *Fortunius Licetus*, in his two Books of the Coextension of souls with their bodies, holds that al souls, yea the rational, are co-extended with the Body.

How souls are co-extened with the Body:

Hence also another controversie hath risen, how in the Augmentation of the parts of the Bodies of Animals which grow the growing parts do receive the Soul; which is attended with exceeding great difficulties, as *Zabarella* also confesses, and is so obscure, that it moved *Sebastianus Basso* (a man otherwise quick-sighted enough in the things of nature) to deny that there is any such thing as a substantial form, and absurdly to hold that the form in a body natural is nothing but a certain collection of particles of the same kind into an excellent kind of Harmony. Now among others, *Jacobus Zabarella* hath written largely of this Question, *Lib.* 1. *de Accretione*, where having in Chap. 13. recited contrary Opinions, and rightly rejected the Opinion of *Scotus* and others, who hold that the Soul flows with the matter, and that in the parts of the matter bred of the Aliment particles of the Soul are bred, and that so just the same soul does not last during the life of the Animal; and had undertaken to defend the other Opinion, that the Soul all the Life time remains the same in number, and when new matter comes is extended to inform the same, Chap. 16. he propounds two very urgent doubts against the same: The first is, That after this manner, when the Soul which is in the old flesh passes over to inform the Flesh newly composed of Nutriment, the Form seems to go out of one subject into another, which seems to be absurd. The other is, That thus the Soul wil seem to be movable of it self; whereas *Aristotle* in the 6. *Physic.* teaches, that Bodies only are of themselves movable; and that the Soul is movable only by accident according to the motion of the Body, in 1. *de Anima*. But *Zabarella* rightly answers to the first, that the Form in this manner does not totally forsake his subject but remains therein, yet passes over to inform new matter, which transition, or diffusion wants a proper name.

And

And to the Second; That the Soul does not paſs over to inform new matter by motion, but after a certain manner to us hid and unknown. Which things although *Baſſo* does laugh at, yet if rightly explained they are moſt true. Al the Errors which many run into in this point do proceed from hence, becauſe they attribute ſuch things to the Form and Soul as belong only to the Body, viz. Quantity, Diviſibility, and parts. But that which *Scaliger* writes concerning the motion of Angels, *Exercit.* 359. *Sect.* 12. is alſo true of the Soul; that it is extended without predicamental Quantity, and moved not with corporeal motion, by paſſing from place to place, but with the motion of a thing incorporeal and extended by changing its *Ubi*. For as it is in *Exercit.* 307. *Sect.* 13. *Whatever is moved is in a place. But the Soul is not in a place, becauſe it hath no quantity. For that which hath quantity cannot be at once in al the parts of a living thing that hath quantity. But the Soul is in every part of the body which hath quantity.* And a little after; *The Soul it ſelf becomes no greater, by means whereof the body is made greater.* And therefore he himſelf cals it not motion properly ſo termed, but in the ſame place he writes: *When it is introduced into that part which is added to the body, the Soul which before was in the magnitude (for example ſake of a foot and an half, is advanced half a foot.* And a little after: *The Soul is transferred by promotion of it ſelf, from it ſelf to al that which is newly added to the body, even to the utmoſt circumference, al the matter being mean while filled which lies betwixt.* For thus when the Nature of a thing is not very cleer, neither is it eaſie to invent names, and thoſe names we uſe are equivocal, and taken from things more known.

Whether the ſoul move?

But that we may in ſome ſort explain the Nature of the Soul as far as the weakneſs of our Underſtanding wil give leave, and that we may declare how we are to underſtand what is commonly ſaid, that the Soul is a total Being, which may be divided, extended, multiplied, and that ſome light may be given to al this Doctrine of the Generation of living things, thus the caſe ſtands. All natural Bodies conſiſt of Matter and Form, which in living things is the Soul. The matter of the Body is of it ſelf ſubject to Quantity, and diviſible into parts having Quantity, and a Body ſo takes up place that it wil admit no other body thereinto, and it is movable from place to place. But the form and ſoul hath no quantity, and therefore it fils and penetrates the whol Body, it is indiviſible of it ſelf, yet is co-extended with the whol Body without quantity. But ſince (as the Schoolmen rightly teach) a thing is ſaid to be ſome where three manner of waies, either Definitively, or Repletively, or Circumſcriptively and Locally: the Body only is circumſcriptively in a place, and ſo ſaid to take up a place. For two Bodies having quantity can never be in the ſame place, and that place which one body hath taken up another cannot poſſeſs unleſs the body firſt by local mutation paſs into another. But ſubſtances free from quantity (as alſo ſenſible ſpecies) can be either divers of them together, or with other bodies in ſome place; of which we have ſpoke more largely in our 1. B. of Natural Philoſophy, chap. 5, and 6. And although the manner of exiſting any where repletively does properly belong to God, who (as *Damaſcen* writes) *is all, and totally every where, wholly in all, and wholly above all*, high, glorious, immenſe, incomparable, incomprehenſible; but Souls are not every where as God is, but are limited and contained within their own Bodies; yet learned Men (and amongſt the reſt *Johannes Faber ſtapulenſis, Dialog.* 2. *Phyſicarum Introduct.*) do attribute the manner of being ſome where repletively to the Soul alſo, and being carried aloft by the wings of their Mind from the loweſt plenitude to the higheſt and infinite, they acknowledg the Image of God who fils al things, and exiſts totally in the World, and totally without, even in Souls; and that rightly. For the Soul of al Animals fils the whol Body which it informs, nor is it hindred though the Body have filled this place before, but that it alſo can be in al the parts of the Body. And al Dimenſions being taken away, the form of any of us may be in the ſame *Ubi* with that of another, nor would the preſence of one hinder the preſence of the other. As we ſee many lights ſcattered through the ſame Air, nor does the preſence of one hinder the preſence of another; and although there are many in the ſame place, yet they are not mingled, which the ſhadows declare. Alſo we may ſee the ſame Soul which at firſt fils the Body of a ſmal Branch ſprung up from an Acorn, and of a ſmal Infant; afterward when the ſaid Branch is grown up to a tall Oak, and the Infant is become a large Man, yet it fills the ſame Bodies though it ſelf be not augmented.

The nature of the ſoul declared.

The Body hath quantity, is diviſible, takes up place, is movable.

The ſoul of it ſelf hath no quantity, fills the body, is indiviſible, is co extended with the Body.

Three manners of being any where, two bodies cannot be together in the ſame place.

What things are repletively any where.

God fils al things.

The ſoul fills the whol body.

And to apply what hath been ſaid to our preſent purpoſe; as when of a ſmal Branch a tal Tree is grown up, or of a Calf an Ox is made, of an Infant a ſtrong wel-ſet Man; the ſoul in the Tree, Ox, Man, is not made larger than when it was in the Branch, Calf, Infant: ſo the ſoul when by the ſeed it gives Eſſence to divers individual matters, it is not made leſſer,

How the ſoul can be multiplied.

nor does it lose any thing, and the soul which is in the seed born by a tall Tree, is no lesse than that which is in the Tree it self.

The soul properly is not divided: whether the soul be co-extended with the body?

By al which it appears that it is more proper to say the soul is multiplied than divided. For since nothing is divided but what hath Quantity, and one part without another, but the Soul hath no quantity, nor hath it one part without another, properly it is not divided neither by it self, nor by accident. The body indeed as having quantity and one part without or behind another, is divided, nor is the part taken from the Body of the same Essence with the whol: but that part of the soul which is separated from the Generator is of the same Essence with the soul of the Generator; and although it be in a smaller body, yet is it as totally and entirely there, as the soul of the Generator is in this Body. And that Extension may offend no man, nor cause him to think that the Soul because it is extended hath parts; let him ponder with himself how that of *Scaliger* is to be understood, *Exercit.* 359. *Sect.* 12. That the Soul is extended without predicamental quantity. Where we must distinguish betwixt extension properly so called, and extension taken only analogically. Extension properly belongs to quantity and bodies which have parts so disposed that where one is the other is not; for examples sake, where the Foot is there the Hand is not. But the Soul although it be joyned to the body, because it informs a body measured and extended, and the plenitude and replency thereof (for so the School-men term it better than Extension, and *Fortunius Licetus* might better have used this word in the Title of his Book *de Coextensione Animarum cum Corpore*) is as large as the body it self, and its dimension, and fills it though it grow never so big, no part being added thereto. Yet there is not one part of the Soul in the Eye, another in the Foot, nor is the Soul in a Man greater than that in an Infant; but as God is immense and infinite every where, not having part without part, or behind or after part: so also after its fashion the soul fils the whol body, not having part after part. Whereby we may easily answer that Objection which hath troubled many, and *Basso* amongst the rest; That if the Soul be totally in the whol Body, it wil follow that when a part of the body is cut off (as for examples sake, the Hand) the Soul wil be divided with the division of the Body. For in such things truly in which the Seminal Principle is spred al the body over, as in a Willow, the Soul is multiplied by cutting off a branch, or as they commonly speak, is divided: but in Animals where Propagation is made by Seed the soul remains intire in its body, though a part of the body be cut off; as also in growing, although the soul communicates it self to the parts added to the body, yet it does not pass out of one subject into another. *Fortunius Licetus* also acknowledged thus much, *Lib.* 2. *de animæ Coextensione, cap.* 4. where he makes a twofold extension, one material belonging to magnitude, which is only in a thing which hath corporeal quantity; the other formal and belonging to an incorporeal substance: and he rightly adds, That although these two extensions, Material and Formal, have an analogy and proportion one to another (viz. Because either of them bounds the thing defined within certain limits: for God alone is totally every where) yet herein they differ, That extension formal so called makes not the thing to which it belongs to be subject to quantity, nor necessarily divisible, either of it self, or by accident: but material extension so called makes a thing both to have quantity and divisibility. Sensible species do also afford an Image of this thing. For if a bright shining thing be in some place, or any other image of a thing, and there be only one man that sees it, or one Looking-glass to receive the Representation; the whol Image of the visible thing is in the eyes of one Man, or in one Glass. But if an hundred, or a thousand, or more men come, or a thousand Glasses be set, the same image which was before received by one Man and by one Glass, does now appear in a thousand Men, and a thousand Looking-glasses; nor yet is the Species or Representation of that visible Object divided into Quantitative parts.

A twofold extension

Every form can multiply it self:

And hence arose that famous Axiome of Philosophers; That every Form multiplies it self. Which although *Zabarella* quotes, *de sensu agente, cap.* 5. where he treats of sensible Species: yet it does not therefore follow (as one unskilfully imagines) that it is only true of accidental Forms. Contrariwise, it is rather generally and primarily true of the substantial forms, and only consequently of the accidental. For substantial forms are really forms; but accidental forms are only their Images and shadows as it were. And therefore if accidental forms have a power to multiply themselves, much more have substantial forms the same power; since accidents do al that they do by vertue of their forms. So that it is apparent that *Zabarella* understood this Axiom of substantial forms, from *Lib. de facultat. animæ, cap.* 11. where he writes, That it is the proper condition of the Vegetative Soul that the Generator should afford some of his own matter and some of his own form; and in that whol Chapter he teaches expresly, that that same vulgar Opinion of the Eduction of Forms out of the

the aptitude of the matter by the action of an external Agent hath by no means place in living things. And *Aristotle* also himself expressly teaches, 2. *de Anima, cap.* 2. *text.* 20. That some Souls do multiply themselves, when he writes that some Plants divided and separated do therefore seem to live because the Soul which is in them is actually indeed one in every Plant, but potentially many; which also he grants in some Animals. Which if it be true in Plants which live divided, why should it not be true in them also which are propagated by Seed, that so the Soul should be said to be one, but potentially many, viz. by the Seed, as wel as they can multiply themselves by the division of their body?

Many manners of the souls propagation.

Now this multiplication is performed divers waies, as shal be said hereafer. But this is common to al, that the Soul should have its proper subject wherein it might cleave, and by which it might be separated from the Generator, and might constitute a new Individual; which is the Seed, or somwhat analogical to the Seed. *All* four-footed Beasts do communicate their Souls by their seed; Birds, Serpents, and Insects some of them, do bring forth Eggs, or somwhat analogical to Eggs, and by them they multiply themselves. In Plants there is a various manner of Propagation, as shal also be said hereafter. For some propagate themselves by Seed, some by Branches, some by a Root or Bulb, and some by divers of these waies. For it is not in them as in Animals, where the Soul is tied to the seed, or to somwhat which answers the Seed, but it is diffused through the whol Plant, or through its parts, so that it can multiply it self by any part if it be put into the ground, so that thence a new Plant wil arise. Nor are the Souls nevertheless divisible in Plants although it be commonly so said; since they have not one part without another, but the body of the Plant only is divided, and is made less by cutting off some bough, branch, or Root: nor does it give part of it self to the Seed, the Branch, the Root, but its whol self, and so multiplies it self.

The soul is multiplied in its proper subject.

Here also I must explain how that is to be understood which I have written in Chap. 9. *de Consens. & Dissens. Chymicorum cum Aristot. & Galeno*, that the forms also of Metals are multiplied after their fashion; since a certain malignant Person hath charged me to hold that a stone begets a stone, and metal begets metal. For I am not so blockish and foolish as to beleeve that this Load-stone, this Diamond, this Crystal, this Gold does engender, as one Poppy breeds another, and one Lettuce another. For multiplication taken in this sence does properly belong to the living and Vegetative Soul; and Generation is the Work of a living body only. Yet this is true in the mean time, That Jewels and precious stones were not al particularly made at the first Creation, but Experience and Histories cited in the place aforesaid, do evince that the Mines and Matrixes of Jewels and Metals being once exhausted are filled again, and others succeed in the room of those that are digged up. This therefore is my Understanding, wherein I agree with *Anselmus Boetius*, and other most learned men; that as in Plants and Animals, by the soul lying hid in the seed is formed a Plant and an Animal; so also by a certain Gold-making, Silver-making, Stone-making, Crystal-making Spirit, containing the Architectonick form in it self, Stones, Jewels, and Metals are generated in the Earth; and from it according to every ones kind, figure, color, and other proper accidents are given to them; and that this Spirit diffuses it self into the exhausted Mines and Quarries of Metals and Jewels, and there generates new Metals and Jewels. But where that Spirit lies hid, and which is the seat thereof (in this darkness of Humane Minds, and the ignorance we are in concerning the Constitution of the inner parts of the Terrestrial Globe) is to us unknown. This is certain, that those Architectonick Spirits are various according to the sorts of Jewels and Metals, nor are they found in al parts of the Earth, but in some places only. And so much by the by, concerning the Generation (as it were) of Stones and Metals, I have said in this place to free my self from Slander.

Whether the forms of Metals are multiplied.

How Metals are generated.

Now the Souls and several sorts of things received their Power of multiplying themselves from the divine Benediction at the first Creation of the world, when God said, *Let the Earth bring forth the Herb seeding Seed, the Fruit Tree bearing Fruit according to its kind, wherein is its own Seed upon the Earth. And Encrease and Multiply.* For God did not only command, as *Thomas Erastus* wel writes, *de occult. med. propr. cap.* 15. that the things created should exist; but also that they should so propagate themselves as he had created them. Nor was that Command of his in vain, but very effectual. For when he commanded, he gave to each a power whereby they were able to accomplish his Command. By virtue therefore of this benediction, and help of the Seed, Souls are propagated as one Candle is lighted by another; and where ever they meet with a fit matter wherein they may subsist by themselves, such as is the body of the seed, they can transfuse themselves thereinto, and as

whence souls have power to multiply themselves

Scaliger

Scaliger saies, cloath themselves therewith, so that that part (if I may so cal it, for it is not properly a part) of the form hath the same Essence with the whol form, which is in the whol from whence it was separated, and afterwards also it begins to perform the same operations; and so the same Essence of the Soul which is in a tall Walnut Tree is in the Nut and that Sprout which arises from the Nut, and afterwards also having obtained fitting matter whereby to augment it self it performs the same operations, produces every year new Branches, and ingenders Nuts. And thus out of the first Individuals of all four-footed Beasts, creeping things, Birds, Fishes, Plants, Animals, at first created, the sorts and kinds have been since continued, and all Beasts, Creeping things, Birds, Fishes, Plants, have been generated by multiplication of their Souls.

Chap. 7. *Arguments to the contrary Answered.*

AND although this is a plain case, so that a Mind not prepossessed with Opinions may easily perceive the truth: yet as commonly happens in this darkness of humane Minds, some are of another Mind, whose Opinions and Arguments to the contrary come now to be examined.

The first thing which hath troubled many so as they could not see the truth, is, that neither in the seeds of Plants, nor in Eggs, nor in an imperfect Conception, those operations are to be seen which are performed by perfect Plants and Animals. But they themselves are not ignorant that the first and second act do differ, nor does an Argument hold from denial of the second act to a denial of the first act. For the Essence of the Soul is in the Seed by the first act, nor can it be proved by any reason that it should afterward receive the same from elsewhere: only the second act is wanting to the Seed since it wants only expres Instruments necessary to perform its operations, which nevertheless it hath a power to prepare. And so the Seed wants only that perfection which belongs to the Body and the structure of its parts, but not that which belongs unto the Soul. Nor can we argue in perfect Plants from the negation of the second act, to the negation of the first, as may be seen in Trees and other Plants which last all the Winter, in which there is no manifest operation: and yet the Soul is really present in them.

The Soul is two waies in the Body

Again, Those actions which proceed from the Soul are twofold, Organical or Second, which are performed in a perfect Body, and Prime or Inorganical, viz, the Vegetation of the Seed, the Formation of the Body, with its nutrition and augmentation. For as soon as the Body begins to be formed, it begins to be nourished. And although the Seed in the Corn-loft be not nourished, yet it hath a Vegetative and Nutritive faculty: after the same manner as Plants pluckt up are likewise not nourished, yet are really animated, and being transplanted into another soil they are again nourished.

The force of Nature, whence it is.

Another thing which troubles *Galen*, is, that the Vegetative faculty being void of Wisdom and reason seems unable to perform so wonderful a work, wherein the greatest Art and wisdom appears, and which cannot be done but by a most wise and powerful Artist. But no man wil wonder at this who knows that the Soul is the Principle and immediate cause of these operations, but yet that it hath not its power from it self, but hath received the same from the most wise and powerful Creator; whence also *Scaliger Exercitat.* 188. & 359. *sect.* 11. defines Nature to be the ordinary power of God, and in *Theophrast. de Causis Plant. cap.* 1. the power of God in the second causes, to which himself hath prescribed certain rules to act by. For as *Thomas Erastus* writes, *de occult. med. propriet. cap.* 15. Nature is nothing but that same command of God by which all things are what they are, and perform that which they are commanded. For God did not only command them to exist, but also to propagate themselves as they were created by him. And what reason hath *Galen* to admire that so wonderful things are done by the formative Faculty, since he might have observed things as strange in the Elements themselves? The Elements are moved in a straight perpendicular Line, upwards and downwards, although they know not what a perpendicular Line is, because God hath commanded them so to do.

What Nature is.

Whether the soul cannot be but in an organical Body.

A third thing which hath moved many is this; That they conceive nothing can be the subject of the Soul but an Organical Body, [being moved thereto by *Aristotle's* definition, who defines the soul to be the act of an Organical body. But *Aristotle* did not define the soul simply considered in its Essence, but in order and respect to the Body. Which nevertheless, since it finds not, but forms and shapes it for it self, it must needs at first be in an inorganical Body.]

Body.] But that an organical Body is not necessary to receive the Soul into, many things do shew. For in the first place, since to an organical constitution is required a certain Quantity, Number, Figure and scituation of parts; all these things are not necessary for the reception of Forms. For Forms (such as souls are) having of themselves no quantity, are received into matter without Quantity or Figure. And this we see manifestly in Plants, in which the Quantity and Figure are variously changed the same soul remaining. For the Quantity and Form of a Branch springing up from a Seed is one, and of the same grown to a tall Tree, another. The stalks of many die in the Winter, the Root remaining alive, and in it the Soul. Again, the figure of bodies is an Effect of the Forms and Souls. And therefore it is not a previous disposition foregoing them. For the Form it self is that which determines the Quantity of its own body, and each Soul brings in a determinate Figure into its own Body, and preserves the same in Nutrition and Augmentation; hence there are so many figures and magnitudes of living bodies as there are differences of souls, and a Rose hath one magnitude and figure, an Oak another, a Fir Tree another; a Partrich hath one, an Hen another, a Peacock another. Thirdly, the Soul is of it self and primarily in the parts as they are similar, and not as they are organical. But the similar parts as such have no certain figure: and therefore the soul is not in them as they have a certain figure, or quantity, but only as they are such similar parts. And it is in the organical parts, only as they consist of similar parts. So that the Soul is not in the Bone, as it is a Tooth, a Shank, an Arm-bone, or an Ankle-bone, but only as it is a Bone, and it is equally in all Bones. And therefore in fractures in which the Bones have many times another figure than naturally they should have the Soul remains nevertheless, and is as much in a great *Callus* as it was before in the sound Bone. And therefore in Nutrition it is brought into the aliment which hath no figure; and it suffices that it hath this or that temperament and similary Constitution. And so the organical disposition is not necessary for the first act, but only for the second act, or to perform the operations. Nor is the body as it is organical simply the adequate subject of the Soul; but then only an organical body when the body is now perfect, and ought to operate, and by its operations to preserve it self alive. And the Organs are required for operation and not to simple being; and then only are necessary to being when the being cannot be preserved without operations; which happens when the Body is already brought to a perfect state. But the figure and organization (as some speak) is after the Soul and not before it; and therefore it is not a disposition necessary to the reception of the Soul. Moreover the dispositions to the form are immutable: but the figure and organization in living things are not immutable. Both is apparent in Animals and Plants. The fortieth day is the longest term set by those that hold the Soul is infused. But then the parts are only rudely delineated. And what shal be said of bruits whose Souls none hold to be infused? Is not the Soul there presently on the first daies of the Conception? And this happens much more in Plants. For in the first daies when Plants begin to shoot and sprout out of their seeds the shape of the Plant is yet so rude that it cannot be known (save by most skilful Herbarists) to be this or that Plant, which afterwards in process of time is many waies changed.

The Form determines the Quantities and Figures.

The Soul is in the parts as they are similar.

Nor is that of any moment which *Sanctacruzius* objects here; since Souls are more noble than the forms of Elements and Bodies simply mixed, they require also a noble configuration and formation, and by how much living things are more noble, by so much the more noble body they require, and hence the so many sundry figures of Plants and Animals have their original. True it is indeed, that all living things by reason of the divers operations they are to perform do require divers organs; and therefore Plants have one manner of shape, Animals another, and every sort is differently figured according to the nobility of the forms. But it does not from thence follow, that those figures are required for the fabrick of the organs, before the introduction of the Soul, and that they are a disposition necessarily foregoing the Introduction of the Soul; because (as hath been said) that same formation of all the Organs is not necessary to simple being, but only for the better being and performance of operations. And if those that contend so eagerly that the body must be organized before the soul can come into it did but observe such things as dayly happen in Nature they would think far otherwise. *Fortunius Licetus* the most renowned professor at *Padua* hath taught sufficiently, *de spont. Vivent. Ortu*, that the soul may remain safe and sure in a matter far more vile and ignoble than any seed can be thought to be, although it be destitute of such things as are requisite to its second Act; which at last having attained a fitting matter does rouze it self up and becomes a Plant or Animal. Of which I shal speak hereafter in *my Discourse of the spontaneous original of living things.*

Fifly,

Fifthly, Some do also use this Argument, which is also the fift Argument of *Thomas Fienus*, *quæst. 6. de format. fœtus*, which *Alphonzus a Caranza*, a Spanish Lawyer, does so highly esteem, in *tract. de partu naturali & legitimo*, *cap. 1. pag. 44.* that he cals it a singular and irreprehensible Argument, and which quite overthrows the contrary Opinion, and therefore he thinks fit to set it down word for word; whose words I wil also transcribe intire, that the Reader may see whether the force of this Argument be so great as *Caranza* imagines. Now thus saies *Fienus*. If in the seed there were an active Principle of Conformation or Generation (as others confound them) the seed should act upon it self; but nothing acts upon it self, as *Aristotle* teaches, *1. de Generat. & Corrupt. cap. 7. Ergo.* Because if any thing should act upon it self, the same thing should be Agent and Patient, in act and power in respect of the same; which is impossible. Secondly, because it would be destructive to it self, especially the seed: because that action thereof should tend of it self to its destruction. For it would tend to the Generation of a living thing, which cannot be done without the destruction of the seed. *Scotus* in *2. sentent. distinct. 18. in fine*, after he had said that the seed is not the active principle of the last form, viz. the rational soul, he enquires whether it can be the previous alterative Principle of an Organical body which is generated; and he concludes that it cannot, and brings this reason among others; because (saies he) this absurdity would follow, that somwhat should act upon it self: which argument he counted so strong, that he said, to find the principle of Conformation we must be forced to fly to the Action of God, and of the Heavens. To answer this argument it is commonly said that in the seed there are two divers substances; the one thin and spirituous, the other gross and terrestrial. That in the former resides the Activity, and the latter is the matter and passive principle; and that the active vertue out of the spirituous part does act upon the thicker part of the seed as upon matter; and that for this reason one and the same thing does not act upon it self, but on a different subject; nor that one and the same thing hath the notion of an active and passive principle in respect of one and the same thing, but only in respect of divers things; which is not absurd. That that same active principle or vertue does reside in the seed, *Aristotle* teaches in *2. de Generat. cap. 3.* in these words: *There is in the seed that which makes it to be fruitful*, viz. *That which is called Heat; and that not fire, nor any such faculty, but a spirit which is contained in the froathy body of the seed, and that nature which is in the seed having affinity with the Element of the Stars.* *Thomas Aquinas* teaches the self same thing, *1. Parte, quæst. 118. art. 4.* in these words: *And therefore there is no need that that same active faculty should have any organ in act, but that it be founded in the spirit it self inclosed in the seed, which is froathy, as the whiteness thereof shews.* And the very same he saies, *2. contra gentes, cap. 89.* and in some other places. But this Answer is not worth a button, and in very truth, is no other than a meer evasion invented to shun the force of the argument. Because it is not true that such a vertue resides in the spirit of the seed. Which is proved first, because the spirit which is in the seed is either an essential part thereof, or it is not. If it be, it wil follow that one essential part of a being is destructive to the other essential part of the said being. This cannot be, first because infinite things are found in the World consisting of divers and heterogeneal parts, in which nevertheless we never find that the one destroyes the other. For if one were ordained to destroy the other, it would follow that it were ordained for the destruction of the whol, and consequently of it self. For one essential part of a thing being destroyed the whol thing is destroyed. But the contrary is true; because the essential parts of one Being are not made to fight one against another, or to destroy one another, but that they may be friendly united, and by their friendly union be able to sustain the form; and the form again is ordained to hold those parts united, and to govern them, that they may not part asunder, nor mutually destroy each other. For if it were not so, the form could never persist and abide in things heterogeneal, no not the smallest time imaginable. Add hereunto, that all action proceeds from a total being, and a perfect being; but the essential parts of one being are not the whol being, nor a perfect being; and consequently they act not by themselves. So far *Fienus*.

Whether the seed acts upon it self?

The soul is the first Agent in the seed.

Two parts in the seed.

But this Argument is not so strong as *Caranza* doth imagine. For in the first place we must know, that to speak properly the seed is not the cause of Conformation, but the soul in the seed. And so when a living body is formed out of seed, the same thing does not act upon it self. For there are in the seed two parts; the soul and the body of the seed. Now the first Agent is the soul, which does not act upon it self, but upon the subject matter, viz. the body of the seed, and also upon the Mothers blood, which in Animals it draws to form the yong one, and in Plants upon that Aliment which it draws out of the Earth. And although

though when a Plant or Animal is generated the seed ceases to be: yet that Generation is no corruption but perfection, and that body which is called Seed whiles it turns to a Plant or Animal it is brought into a more noble state and perfected; nor (as *Jul. Cæs. Scaliger* speaks, *Exercitat.* 268.) is the Seed otherwise said to be corrupted than that it ceases to be as it was before, viz. in aptitude, and becomes as it was not, viz. in act. Now it is the same matter with the same formal Principle, to which nothing else is added than the expression of the Organs which were before confused. And thus while of the Seed is made a Plant or Animal, the Body of the Seed does not transfer it self into another condition, but by the Soul lying hid therein it is thereto advanced. Nor (as *Fienus* thinks) will he that shal diligently weigh al these things use that answer which *Fienus* brings and endeavors to refute, that there are two divers substances in the Seed, the one thin and spirituous, the other gross and earthy; and in the former resides the active vertue, the latter being the matter and passive principle. Such a spirit there is indeed in Seed, but it is not the primary cause of conformation, but the Instrumental; but the Soul which uses that spirit is the primary cause. And whereas he dares deny that there is a spirit in the seed, I can scarce sufficiently admire it, and the reasons whereby he would prove it are very sleight. For in the first place that spirit which is in the seed as an Essential part tends not to the destruction but to the perfection thereof. Also it is false that every action proceeds from a total being. For is there no action of the soul upon the body which it informs? And whereas he denies there is a spirit in the seeds of other living things, we shal refute that hereafter.

whether the Efficient Cause be alwaies external?

Fiftly, This also offends some that they suppose that thus the distinction is taken away betwixt the internal and external Causes: of which the former are the matter and form, the latter the Efficient and End: and they aver that no Efficient Cause does ever go into the Essence of the Effect, and that Animals in Generation do not produce seed either out of their own matter, or out of their own form; but that the seed is generated of the mixture of blood and spirit in the stones, and that a man does not generate by communication of his Essence, but by his form as an Efficient Cause. But in very deed, this Doctrine of the propagation of Souls does no waies take away the distinction of Causes. For it is known even to Novices in Philosophy, that the same Essence may be both the Form and the Efficient Cause, the Form as it informs the Matter, the Efficient as it is the cause of al Operations performed in the compouud. The rest are but Beggings of the Question, and are said, not proved. I like *Zabarella*'s Opinion better, who writes, *de facultat. animæ, cap.* 11. *That living things when they generate their like do confer and bestow some of their matter, and some of their form, inasmuch as they confer an animated seed, and endued with the same vital faculty which was in the Generator.* For although they communicate no part of their own body, yet they communicate that self same matter of which they are nourished, but changed into a more noble substance. But that which hath brought very many into this Error is this, Because they conceit living things are generated after the same manner as artificial things are produced by an external Agent. But there is a great difference betwixt Artificial and Natural things. For every Artificer communicates nothing of his own: but living things which beget their like cannot do the same unless they communicate their own Essence.

The difference betwixt Nature and an Artificer.

whether the soul goes out of one subject into another.

Sixtly, Neither is that of any moment that they suppose if Generation should be made by transmission of the soul, that then the soul should pass into another matter as a new subject, or should be of it self divisible. For as in Augmentation, and when of an Acorn a tal Oak grows up, the Soul when it communicates it self to new matter does not pass from one subject to another, but remaining stil the same communicates it self to new matter: so when the soul communicates it self to the seed it does not pass from one subject to another, but remaining the same in the Generator it diffuses it self into the seed. Nor is it therefore of it self divisible. For as when a root or branch is pluckt from a Plant, of which (being set in the ground) a new Plant arises, the soul of the former Plant is not diminished, but remains entirely the same: so also when a soul is communicated by the Generator to the seed, the soul of the Generator is not made lesser, but remains the same it was. Nor is there here any difference betwixt the Root and the branch pluckt from the Plant and the Seed. For there are several waies of propagating Plants. And that the root and branch is animated, but not the seed, is only said, but not proved. For though the Seed be not a part as the root and branch is; yet it is the fruit of the Plant which is animated as much as the parts are, yea, and contains the soul after a more excellent manner.

The soul is not divisible.

Seventhly, Many do also object this, That if the seed of the Plant were animated it should be already essentially a Plant. But if it were essentially a Plant when it grows out

whether the seed be a Plant?

of the ground, there would be no Generation of a Plant, and so in the Tree and that Herb in which the Seed was produced there should be a generation, and a Tree or Herb should be generated in a Tree or Herb, and not in the Earth; which is absurd. But the whol argument is granted in its sense, and that which is counted absurd is no waies absurd indeed, provided it be rightly explained. For truly the generation of the seed in a living thing does not finish the Generation; howbeit the principal and chief work which is necessary to Generation is the Elaboration of the seminal matter that it may be a fit subject wherewith the soul may be propagated, and the communication of the Soul to the matter so elaborated. Howbeit this also afterward belongs to Generation, that the seed which hath received the Soul from the Generator may no longer adhere to the Generator, but may be separated therefrom, and that that which before was but one individual of the same kind may now become more than one. Which when it is performed a Tree or Herb is truly said to generate, but not when the Plant grows up out of the Earth. And when a Plant shoots up out of the Earth that is not its generation, but it is the bringing of a Plant which is in its imperfect act to its perfect act. Nor is it considerable, as *Fienus* himself writes, *quæst.* 5. *concluf.* 6. (though he be otherwise of a contrary Opinion in this Question) what the common People cal Generation, or what not; nor what agrees with their understanding, but what is suitable to right reason and to truth. For the common people are ignorant of Philosophy, and know not when or where the true production of a Plant is made, and its Essential Generation; and know not how to distinguish betwixt the first and the second act; betwixt that which is imperfect and that which is perfect, and therefore takes one for another, and conceits that a Plant is then generated when it is perfected and operates, and when it brings forth roots and Leaves, whose production is not the very Generation of the Plant, but the operation and perfection thereof being already generated. And *Aristotle* himself calls the seed and that out of which it is bred, *Synonyma's*; We must therefore distinguish betwixt the Entitive and Formal Act, and that which is simply Formal, and respectively. For then is the Form said to be present in a perfect act when it hath al its Organs necessary to perform its actions, but not when it is in a part, or in the matter of the seed, and that not yet fitted with al its Organs. For otherwise the branch of a Fir-tree (in which it cannot be denied that the soul is) should be called a Fir-tree; and the Foot of a Man should be called a Man. And therefore we cannot argue from the presence of the Form to the denomination of the thing formed, but then a thing is rightly said to be an Animal or other living body when the soul is in its subject rightly disposed, or can perform the Operations belonging to its kind.

what things are required to generation.

when Generation is made.

How many waies the form is in a thing.

whether the seed be an Animal

Eightly, Out of which their Objection may easily be answered, who say, If the seed were actually animated, the seed of a Poppy were a Poppy, and the seed of a Dog would be a Dog. For the sorts of Natural things are not denominated from the Essence which the Form gives, but from that Constitution whereby they are sensible species of the World. And therefore though in respect of the Form the Essence of a Dog and of the seed of a Dog is one and the same; yet since the Constitution of the seed and the Dog differ in respect of the Corporeal and sensible parts, the seed is not called a Dog, but the seed of a Dog. After the same manner though there be one and the same Soul in the Butter-fly and the Silk-worm, yet the Silkworm is not called a Butter-fly till it hath wings and can flie.

whether the seed lives?

How many waies life is taken?

Ninthly, They say, if the seed were animated it should live, if it lived it would grow, for every living thing is nourished as long as it lives, as *Aristotle* testifies *de Respirat. cap. ult.* But because seeds lying in Corn-lofts and granaries, or shut up in Chests and Boxes are not nourished, therefore they do not live, and consequently they have no soul in them. But life is taken two manner of waies, either for the first act, or the essence it self of living things, or for the second act or operation. Seeds live by the first act, but not necessarily by the second act, nor do they necessarily perform the actions of living things. And that place of *Aristotle* is only to be understood of living things perfectly formed. But in the mean while the soul in the seed is not quite idle, but it keeps the seed alive, and therefore seeds are so long fruitful as they retain the soul in them: but after they have lost the soul they become dead and unfruitful. Nor are the Operations of the Soul confined to nutrition only, but there are also other Operations thereof, as Conformation. Yet as soon as any Conformation is made, and as soon as the seed hath attained a fit place and matter, the soul presently draws nourishment for the formation and nutrition of its body.

And thus I conceive it is proved in general, That the soul is in the seed, and that it is the Cause of the Conformation of the Body animate, and I conceive al Objections are fully answered.

swered. Howbeit some when they can hardly object any solid reason against our Opinion do fly to the Authority of *Aristotle*, but miss-understood, and they say that *Aristotle* writes that the seed is potentially animated, and that therefore there is not actually any soul in the seed. But here the most renowned *Casparus Hofmannus* rightly answers, *tract. de origine formarum*, that *Aristotle* does so often attribute an act to the seed, that it is the part of a man very unskilful to urge only those places wherein he saies it is an aptitude. Howbeit, more Reasons shal be produced in the following Chapters, wherein we shal treat particularly of the generation of living things, viz. Plants and Animals: and what hath hitherto been alleadged shal be explained and confirmed, and such objections as may yet be made shal be answered.

Whether the seed be potentially animated?

See also of this Subject the lately commended Doctor *Caspar Hofmannus*, who in *tract. de form. origin.* joyned to his Books of the Generation of Man, proves the same Opinion by most firm reasons, and solidly refutes the contrary Opinion of *Bonamicus*, the Conimbricensian Collegiates, *Peter Fonseca*, *Franc. Suarez*, *Ant. Ruvio*, *Benedictus Pererius*, *Franciscus Vicomercatus*, *Fredericus Pendasius*. And in good deed the judgment which he makes of the Conimbricensian Collegiates is most true of al those who defend the Eduction of the Soul out of the aptitude of the matter, and deny that seeds are actually animated. Not to say (quoth he) that they mix many things not belonging to Natural Philosophy, they invent distinctions little less than foolish, they put conditions where they ought not to be, the greatest difficulties they touch not so much as with their little finger: in a word, they intangle and obscure, but do not explain the Question.

But the Soul frequently uses the Spirit (in its shaping the Body) which is in the seed, and makes it to be fruitful, and resembles the Element of the Stars, as *Aristotle* tels us, 2. *de generat. cap.* 3. And as long as that spirit is in the Seeds, so long the soul is as it were in its proper subject: but as soon as that spirit vanishes, the Soul can abide no longer in the seed, and the seed becomes unfruitful. Which spirit I admire that *Fienus* could not discern. Certainly if he had seen a spirit drawn by Chymical distillation out of dry seeds which wil take flame, he would not have written, *de format. mat. quæst.* 6. what spirituous substance can there be in the seeds of Plants, kept a long time in a Box, and dry, but yet fruitful?

The soul uses the spirit when it shapes the body.

Whether there be a spirit in the seeds of Plants.

He indeed objects in *Apolog. Adversus Sanctacruzium*, *pag.* 99. If there are (quoth he) Spirits in Plants, in what place are they generated? For there ought, as in Animals, so in Plants some place be assigned, in which they spring, and from which they flow into the Plant. Again, he saies; there is no actual Heat. But in Plants there seems to be no actual Hear. For if there were it would be perceived some way or other. For a tangible quality is the proper object of the sense of feeling. Therefore where it is it must needs be perceived. How comes it therefore that in a great heap of Herbs, and a great heap of Seeds, Corn, Pulse, there is not at least some smal heat perceived? Thirdly, heat and cold are contrary qualities, and mutually destroy one another, and the greater and more intense does overcome and corrupt the lesser; how can it therefore be that this heat in so many Plants which last all the Winter, should not be extinguished. For the Heat of infinite living Creatures being much greater, is extinguished by the Winter cold, and why should not that of Plants be extinguished if they have any?

But these are toies unworthy so famous a man. For, first there needs no place nor cavity in Plants for this spirit to breed in as there is in Animals: for as they have not any thing answering to the stomach or Liver of Animals, wherein their nutriment is bred, but that nutritive power is spred through their whol body: even so that spirit is bred in the whol body of the Plant. And if any man shal hold, that in the root or trunk rather, as the nutriment so the spirit also is chiefly elaborated, he wil hold nothing that is absurd. And that there is such a part in Plants that are tender is manifest, as in the Colewort and many more. For although the cold and frost do so hurt the Leaves that they die: yet if that part which is in the middle, which the Germans cal the Heart, remain safe and sound, the Plant recollects it self and grows again. But if that part be also hurt the whol Plant dies. For although (as *Fienus* objects) branches cut from the Tree do grow; yet that makes not against our Assertion. For as those souls according to the division of their subject, are in some sort divisible; so also the spirits are which make the proper subject of the Soul.

Secondly, That also is of no moment which he saies: where there is no Heat, there is no Spirit; and where Heat is it must needs be felt. Is there not I pray you Heat in the Spirit of Wine? and is it actually felt? Is there not fire in all mixt bodies? and yet are they al actually hot? by no means. For as *Zabarella* rightly teaches, *Lib. 2. de mist. generat.*

rat. & Interit. the Qualities in mixt bodies are after a sort hidden by the tempering of contraries, so that neither of them can be distinctly discerned. Nor is that objection of any force if it be not felt in one Plant, it ought to be felt in a great Heap of Plants. For the Nature and proportion of mixture is one and the same in a great Heap of Plants as it is in one Plant. But hath *Fienus* never seen what an Heat is raised when such an heap of Plants comes to putrifie, or when an heap of Corn begins to sprout? Certainly in Granaries even in the coldest time of Winter, heaps of Corn which have lain long unstirred do conceive no smal Heat, which a man may feel with his Hand. Yea and the Corn it self if it lie long unstirred does sprout.

Thirdly, That this same Spirit and Heat in some Plants (for all do not outlast the Winters cold) is extinguished, comes from the nature of mixture. For there is a several mixture in several Animals and in several Plants. Geese go bare-foot in the cold Ice which men cannot do. Rosemary is hurt with a smal cold, but so is not the Fir-tree. But I easily agree with *Fienus* that some hidden Quality of kin to the Element of the Stars does concur.

Chap. 8. *Of the Generation and Propagation of Plants.*

And so much may suffice to be said of the Original of Souls in General: and it hath been sufficiently declared that all living things do multiply themselves by their seeds, and that in the seed is the Soul which is is transfused from the Generator into the thing generated. For the clearer manifestation whereof I think it best to declare the same particularly with reference to the several kinds of live things. Now there are two kinds of live things, Plants and Animals, or living creatures: which have also a different way of propagation. For there is in some living Creatures sexes, in others not. In such as have no sexes one seed is sufficient, which is a body so elaborate and disposed by the Generator, that when it is perfect it may be seperated from the Generator, subsist intire by it self, and with it the soul of the Generator may be transferred into the thing generated. And then a Tree ingenders as (*Scaliger* saies, *Exercit.* 6. *sect.* 10.) when it produces seed. And that this seed is animated, appears from the reasons propounded in the foregoing Chapter; and it is so manifest, that *Joh. Gallego de la serna* a Spaniard, was forced to grant that the seeds of Plants were animated, *de Princip. Generat. Lib.* 2. *cap.* 6. (although he denies that the seeds of Animals are animated) and writes that this opinion is so founded upon the most firm reasons of Philosophy, that they being understood no true Philosopher can deny the same. And the reasons are indeed most strong whereby it is proved that the seed of Plants is animated. For in the first place since when the seed was in the Plants it was animated as being a part of the Plant, surely when it is separated it must be animated; since no cause can be assigned which drove out the soul, nor can separation alone do that, for even in the separated seed also the actions of a soul appear, and therefore as Branches, Roots, Buds, Bulbs, by avulsion do not lose their soul, but grow and flourish: it is also so ordered that the seed being separated from the Generator can subsist intire and fresh, although some seed a longer, other some a shorter while, which other parts pluckt from Plants do not commonly do, but presently die. Moreover as soon as by the Heat of the Sun, yea and of the Fire in the Winter time, it is but warmed in a stove, and finds fit matter, or but a little Water if it be moistened therewith as is seen in the making of Malt, it begins to display it self, and first thrusts out a Root, by which afterwards it draws nourishment, and forms the body of a Plant like that it came from: which formation of the bodies of Plants is no less wonderful than the Generation of Animals. For so it attracts matter fit for every part, Roots, Flowers, Fruits, and gives all parts their Magnitude, Figure, Scituation, Colour, in a certain measured proportion, that no Geometrician or Painter can imitate its workmanship. Moreover, since we see that Plants not only by their Roots, but also by a smal Branch of a Willow, a bit of an Hop or Acorns Root cut off do grow up into a like Plant, the Soul being pluckt away with the part; and it is manifest that of a branch of a Willow or a Vine, or of another Tree, although in it there is no Root, nor all the parts of a Plant, yea of a Leafe only of an Indian Fig-tree an whol entire Plant is formed; and no other cause can be assigned of the formation of this new Plant than the soul pluckt away from the former Plant with a part thereof: why should we not conclude that a Plant is formed of the seed after the same manner? Nor is it credible that al the other productions of Plants are made by the communication of the soul from the former Plant and

How many kinds of live things

The seed of Plants is animated.

The wonderful Generation of Plants.

and only that made by the seed should be performed without the presence of the soul in the seed. But more likely it is that as when Roots, Bulbs, Branches, Boughs are put in the Earth they do not from thence receive their soul, but that with the soul which they actually had they perfect themselves by producing necessary parts and organs: that in the same manner also it is in seed. Nay we have more reason to think that this should happen in seed, because it is generated by the Plant to this very Intent, and hath a much more perfect disposition necessary for the conservation of the soul and its propagation than the Roots or Branches; since the wonderful artifice of Nature is apparent in many seeds. There is indeed one man who conceives that this does not declare the manner of the souls propagation, for this reason, because in Growing whatever grows on the Plant is a part of its body, and the part ought to have the same soul that the whol hath: but the seed is no part of the body nor grows fast to the same. But although it cannot be denied that the seed of a Plant since it is not generated to that end to abide upon the Plant, nor does alwaies stick to the same, but may be separated therefrom, is not after the same manner a part of the Plant: yet because while it is in the Plant it lives by the common soul of the Plant, in that sence also it may be called a part of the Plant. But since it is made to be separated therefrom, it may most conveniently (as was said in *Cap.*6.) be termed the fruit. Which is equally animated with, yea and after a more noble manner than the parts, viz. inasmuch as thereby the soul may be propagated, which in Animals by the parts it cannot be. Sure it is in the mean while, that as when the Soul is diffused into new matter it becomes neither greater nor lesser: so also when the soul is propagated with the Seed; the soul of the Parent is not diminished thereby.

Sundry manners of the propagation of Plants.

For here it is to be noted, That there is not one and the same manner of propagation in Plants; which being observed that may easily be cleared which hath scrupled some, and among the rest also *Franciscus Vallesius*, *de sacra Philosoph*, *cap.* 1. how that should be true which we find written in *Genesis* 1. verse 11. that God commanded that the Earth should bring forth Herbs or Plants, having Seed in themselves according to their kind; when as the Willow, Fern, and very many Plants besides, do bear no seed. For the seminal nature in Plants is not one and the same, nor does it confine the seed to Fruits and Cods only; but this happens to some alone; but in others the seminal Vertue is adherent in other parts, somtimes in one, somtimes in more, and somtimes in different parts. For examples sake, Poppy is propagated only by its seed, not by its root, stalk, or leaf. And so it is with Lettuce and very many more. Rosemary is propagated both by seed and branch, and so are Pear-trees and Apple-trees; the Hop by its root; the Indian Fig-tree by its leaf; Onions and most bulbed Plants by root and seed both; such as bear buds, goslings, or palms, are propagated by their branches, as the Vine, Willow, and others. Also some have their seminal vertue in the tears or liquor which drops from them. For as the souls are more or less noble; so for the multiplication of themselves they require a more or less noble matter wherein to propagate their seminal vertue. And hence it comes to pass that Mushroms or Toadstools being the most ignoble of al Plants are propagated only by pouring their decoction about the Roots of Trees. Yea, the seminal matter of Plants may be transferred in inundations of Water, and in Rains, as *Theophrastus*, *Lib.* 1. *de Causis plant. cap.* 5. relates, how by reason of a certain thick shower of Rain, *Laserpitium* sprung up in *Apturea*, whereas it had never grown in that part of the World before; and that there a great Wood hath grown up where there never was any before. So that it may rightly be said of such things which are beleeved to spring out of the Earth of their own accord, that the nature seminal rather lies hid than is not, as shal be said hereafter when we handle the Original of things which spring of themselves. Nor am I inclined to say with *Vallesius*, that there are either Animals or Plants, which though at the first they were not created, yet they might afterwards grow naturally from the Elements of the World. For the Elements of the World have no vertue to produce such a seed. Nor let any man attribute this Formation of Plants to the Suns Heat. For this Formation is not only made when a Plant is cherished by the Heat of the Sun, but by the Heat of the Fire also. And it belongs to the Form and not to the Sun to determine Quantities. For Nature uses Heat as a Minister or Instrument, not as a Law-giver or Work-master. Otherwise in al Plants that same Quantity would be produced, and the same figure. For the Sun is the same to al; and the store-house of Mother Earth is the same; and the contrary is seen to happen, as *Julius Cæsar Scaliger* writes in 1. *de Plantis*.

Plants propagated by Inundations of water, and by rains.

The formation of Plants not caused by the Sun.

Nor

Nor let that trouble any man in this place which *Thomas Fienus* alleadges *de format. fœt. quest. 5.* as also was said before, that a Plant is produced after one manner from a Root, a Branch, or Leaf, and after another manner from the seed. That out of the former a new Plant is not produced, but they themselves when cut off from the Plant are new Plants, because by the cutting from the whol, they have already the vegetative soul multiplied by division, but that the contrary happens in seed. For that the seed is not a new plant, because it hath no soul, but it becomes a new Plant by the souls coming into it after it is planted in the Earth. But here is no diversity of propagation; for the Root, the Branch, the Leaf, is not an entire Plant, and after the same manner as by the cuttting off of these from the Plant, the soul is multiplied by division; so also by the Generation and emission of seed the soul is multiplied. And whereas he grants the Soul is in the Root, the Branch, the Leaf, and denies it to be in the Seed, he does it without Reason. For since in it the same Operations appear as in those; why should we not grant the soul to be as wel in it? And if in the Seed cast into the Earth there is no Soul, whence I pray you is it afterward produced therein, and whence communicated? Also that is false which he writes; That the Soul which is in the Branch or the Root planted, is the same numerically with that which is in the Tree, or whol Plant. Indeed it was the same in number while the root or branch was on the Tree; but after it was cut from the Tree it began to exist by it self; and was made different in number from that in the Tree. I wonder also that *Fienus* should deny the Seed of Plants to be animated, since nevertheless in the Chapter foregoing, *quæst. 5. Concluf. 6.* he expressly holds that the Conformation of the Seed in the Earth is not an essential Generation, but only the perfection of a new Plant already constituted and generated in the Tree. For there is no other Generation of a Plant in the Tree, save when seed is generated.

The wonderful multiplication of Plants.

But concerning the Seed of Plants, two things are here to be observed: the first is, That that same multiplication whereby the Soul diffuses it self into the new Plant, is most of all manifest in Plants, and almost infinite. Not to speak of Poppy, Turky Wheat, and very many others; Tobacco does so multiply it self, that he who first by numbring, and then by weighing (for it were an endless labor to number al the seeds) wil take a scantling and compute the number of the seeds, he shal find that of one Seed more than three hundred thousand seeds do spring; and if the product of these be sown the third year, he shal find an encrease of an hundred thousand Myriads (a myriad containing ten thousand.) So powerful was that Divine Benediction; *Encrease and multiply.*

Two parts of the seed in Plants.

Moreover, This also is to be noted touching the seed of Plants, That in them as in al seeds there are two parts; the one primary and which is only worthy of the name of seed; and another which serves only as a covering. The former consists of the Soul, which is the Author of the life and formation of a Plant, and the matter, of which the first rudiments of the Plant, viz. the Root and the first Sprouts are constituted. For the Seeds of Plants in whatever place moistened and cherished with heat, even without the Earth, do first gape and thrust out their roots, and afterwards their first sproutings: but the body of the perfect Plant cannot be entirely formed, unless aliment be drawn from the Earth by the first smal roots. And so in these there is not the same Agent and Patient, but the Soul is the Cause of Formation, I say the Efficient and Agent Cause, and the Matter is the Patient on which it works. But that which in Plants is properly the Seed, and hath the soul and matter out of which the first Rudiments of the Plants are framed is only that pulp which contains in it the Idea and delineation of the whol Plant. And indeed the whol pulp of the Seed is not animated, but only that part thereof which is commonly called *Corculum.* Which part if it be corrupted, the seed wil not grow. And therefore the Pismires are reported to gnaw that part of the seed that when it is by them hoorded up it may not sprout. Contrariwise, although the rest of the Body be gnawn by worms, yet it grows, provided the Heart be safe, as we see in Beans and Pease, and French-beans. But the rest and greatest part of the Pulp is not made in vain, but is in place of Nutriment as it were for the tender Plant which is immediately produced of the seed most properly so called, as is easie to see in French Beans, which being set in the ground, when they begin to shoot one part goes downwards and makes a root, the other goes upward and makes the rest of the Body of the Plant. On one side of this tender Plant lies the rest of the body of the seed, out of which a channel or pipe of Conveyance goes into the tender Plant, by which alimentary juyce is carried thereinto, until it grows up and gets strength of it self to draw alimentary juyce out of the Earth to it self, and to elaborate the same. In respect therefore of the pulp of seeds it happens that the remaining part of the seed so called, viz. the external Bark, is only the Case (as it were) of the true seed which defends the pulp or

The pulp of the seed.

The Bark of seed why made

true

true ſeed againſt external injuries, and that external Bark to the Barks, and Shels, and Membranes of Eggs. For ſince the ſeeds of Plants are not preſently caſt into the Mothers Womb as the ſeed of Creatures that bring forth live young ones is, but are many times kept long out of the Earth which is their Matrix, this Bark defends that ſame internal ſeed againſt the external injuries, leſt before it begins to ſprout, or in the very ſprouting, it ſhould be hurt by external occurrent cauſes.

From which it appears, although (as was ſaid before *cap.* 6.) the ſeed may alſo be called Fruit: yet that there is ſome difference betwixt Fruit and Seed. For that is properly ſeed which is ſimply neceſſary to generation ſuch as is the marrow of the ſeed, which alſo nevertheleſs becauſe it is produced by the Generator it may alſo be termed the Fruit. But becauſe the Creator hath compaſſed ſome ſeeds with Pulps which are not neceſſary for the generation of that ſpecies, but ſerve for meat for man or for other uſes, as in Cherries, Apples, Pears, Peaches, Grapes, all that wherein the Seed is is commonly called the Fruit. And ſo according to nature the Fruit is either Seed, or that which contains ſeed in it, as *Ariſtotle* writes, 1. *de generat. Animalium, cap.* 18. Yet by Art it may come to paſs that the fruit ſo called may be without ſeed: as Cherries without Cherry ſtones, and the Berries of Grapes without ſtones: which is performed by taking the marrow out of the Branch. From which it appears that the Marrow in Trees does chiefly make towards Generation.

Chap. 9. *Of the Generation and Propagation of Animals in General, and of Bruits in Special.*

HAving ſaid thus much in general of the Original of living things, and then more eſpecially of Plants; in the next place we are to treat of the propagation of live things, and firſt of Bruits. Where in the firſt place we are to give warning that ſome think too meanly, yea, and groſly of the Souls of bruit Beaſts. For ſome (truly) there are whoſe underſtanding is ſo plunged in the Elements that they can underſtand nothing above them; and therefore they endeavor to deduce al things out of the Elements, and dare to write that the firſt individuals of bruit Beaſts were totally and according to either part (*viz.* their matter and form) produced of the Elements, and that al bruit Animals both in reſpect of their body and their ſoul are in al generations Elementary, and ſhal continue ſuch to al Generations. But *Scaliger* was much more in the right, *Exercit.* 307. *Sect.* 20. judging of the Souls of Bruits from their actions which are far above the forces of the Elements. For admirable and wonderful actions appear in Bruits, which can proceed from no Element nor Elementary nature, but depend upon a more noble Principle. Such wonderful things are related of the wit and capacity of Elephants, that they ſeem to tranſcend all belief, unleſs they were related by credible Perſons, *Pliny*, *Lib.* 8. *cap.* 3. 4. 5. *Chriſtopher Acoſta*, and at large by *Juſtus Lipſius*, *Cent.* 1. *Epiſt.* 50. What wonderful things in Peace, what admirable things in War an Horſe performs, the ſame *Lipſius* ſhews plentifully; *Century* 3. *ad Belgas*, *Epiſt.* 56. What happened to the Sybarites who could dance both they and their Horſes, Hiſtories teſtifie. And who wil not beleeve the moſt credible *Scaliger* being an Eye Witneſs, who relates a ſtrange ſtory of the apprehenſiveneſs of an Horſe, *Exercit.* 209. concerning *Alexanders* Horſe *Bucephalus* who does not read ſtrange things both out of *Gellius*, and many other Hiſtorians? Alſo what the Sagacity of Dogs is, and their fidelity to their Maſters, and their aptneſs to learn any thing may be learn'd from *Pliny*, *Scaliger*, *Camerarius*, and *Lipſius*, *Cent. ſing. ad Italos & Hiſpanos*, *Epiſt.* 59. & *Cent.* 1. *ad* Belgas, *Epiſt.* 44. yea, and it is manifeſt by dayly Experience. What tricks Apes play, and how they counterfeit mens actions, is unknown to none. That an Hare learn'd to keep company among Dogs without fear, and would go on hunting with them (among many other ſuch things) *Julius Cæſar Scaliger* teſtifies, *Exercitat.* 224. Among Birds *Juſtus Lipſius* reckons the Letter-carrying Pidgeons, in *Epiſt.* 59. *Cent. ſing. ad Italos & Hiſpanos.* Who knows not that Parrots wil learn to ſpeak as men ſpeak; yea, that the Mag-pie, Nightingale, and Thruſh wil do as much, *Martial*, *Plutarch*, *Ovid*, *Pliny*, and many others witneſs. That Cranes journey with a certain Diſcipline and keep watch, is averred by thoſe that write the Hiſtory of Birds. The wit and induſtry of Bees and Piſmires is vulgarly known. Every Cottage is ful of the Artificial Works of the Spider. Beaſts know their own ſtrength and Arms and their own weakneſs, and have their familiar Medicines which they are acquainted with.

whether the Souls of Bruits ſpring from the Elements?

the wonderful underſtanding of Bruits.

Which

Which wonderful abilities and works of Bruits they that endeavor to derive from an Elementary principle do but wash the Blackmore.

And as the Operations of Animals are more various and wonderful than those of Plants; so their propagation is more labored and curious. It is not my intent in this place to propound al that may be said of their differences and various Originals, but only as much as shal suffice to declare the propagation of their souls. Now to the Generation of perfect Animals there is required a double Generator, and neither is of it self sufficient to Generation; though there is a controversie as touching the manner. For I know the disputes betwixt the Aristoteleans and Physitians concerning this point, whiles the former conceive that the seed of the Male is the only efficient, and that the Female affords nothing but matter: but the latter hold that the Female affords seed also which is both effectual and fruitful. Which great Controversie being *prolixe* I think not fit to handle the same in this place. Certain it is that neither Male alone, nor the Female alone is sufficient to generate a living Creature, but both of them contribute their share whatever it is to the constitution of an Animal. Whence *Empedocles* also (as appears in *Aristotle*, 1. *de gener. animal.* c. 18.) said, That it is the joynt contribution of the male and female, but the whol proceeds from neither of them. They indeed that hold that the Seed of the male only does concur actually to generation may easily free themselves from many Objections urged against their Opinion. But most Physitians think the contrary, who hold that the formative vertue is as wel in the Seed of the Female as of the Male; and they conceive they have reason so to think, as for other causes, so because of the likeness of the yong ones, somtime to the Father, somtime to the Mother, and somtime to both: not only when Animals are generated by Animals of the same sort; but then also when Generation is made by Animals of different sorts, wherein the work of the Fathers and Mothers soul does manifestly appear. So a Mule is made of a Mare and a hee Ass, a Mulet of a stone Horse and a shee Ass; of an Ox and an Ass the strongest sort of Mules; the Indian Dog of a Tiger and a Bitch; the Dog-lyon of a Lyon and a Bitch; a strong Dog of a Wolf and a Bitch; the Laconick Dogs of a Dog and a shee Fox; of the Pard and Lyoness the Leopard; a Musmus of a shee Goat and a Ram; and many other Animals: of which see *Johannes Baptista Porta, Lib.* 2. *Mag. Natural.* Yea, and Histories record that a Woman coupling with a Beast hath brought forth a Creature like her self. Yet these men can easily free themselves from dubious objections. For this Law hath been established by the Creator, that as it were from two partial causes one principle and one total cause should arise, from whence one motion and efficiency should arise to the production of the yong Animal, but in a certain Order and Method. Nor should the Mixture of Souls or Forms offend any one in this case, by reason of some feigned Metaphysical Axioms, For the Male and Female are of the same sort, and therefore it is as little absurd that the soul of the two seeds should be conjoyned as for two flames to be united. *Hippocrates* did not count the mixture of souls so absurd a thing, as appears by that Speech of his, *Lib.* 1. *de Vict. rat. text.* 61. *If any man cannot think that souls are mingled, he is void of reason.* Here *Fienus* objects in his 6. *Quæst. de form. fœt.* If the Seeds should be mixed, and the actions of both should concur, their effect would alwaies be mixed, and alwaies half Masculine and half Feminine, and no yong one would ever perfectly resemble the Father or the Mother, but alwaies partly one, and partly the other. Also he thinks it impossible that those two vertues can alwaies so evenly conspire to one effect, but that they should often err, and instead of one part make two; or instead of two one, one formative vertue making one in this place, and of this part of the seed, and the other making another in another place and of another part of the seed; so that Monsters would be frequently ingendred. *Averrhoes* and others do easily answer this Objection who hold there is no active Principle in the Seed of the Female. But they also who hold that there is an active Principle, and a formative Faculty in the Females seed, have an answer for this Objection. How that God made two Sexes, and in al Animals created both Male and Female is a sure thing; but why he made Sexes is known to his own Wisdom. *Plato* relates a Fable in *Symposio*, That in the beginning there was no difference of Sexes amongst Men, and that al were then Hermaphrodites, but because of their Pride and Arrogance God cut Men asunder, and established the two Sexes distinct one from another, so that one could do nothing towards its own preservation without the other. But Sexes are not in Man-kind alone, but in other Animals also.

The Sexes in Animals

The seed of the female is prolifick.

The mixture of Forms is possible.

But to the Objections of *Fienus* it may be answered, That there alwaies appears a sign of the conjunction of both souls, and there is no creature but the yong one does resemble both the Parents, either in the external form of Body, or the dispositions of the mind, or in both.

Yet

Yet it is not neceſſary that they ſhould alwaies equally reſemble both Parents. For if either of the ſeeds be ſtronger than the other the yong wil moſt reſemble the Parent which that ſeed came from. Nor is it any way neceſſary that an Error ſhould be committed in conformation if the ſouls be conjoyned. For they are of the ſame ſpecies & like as when two flames are united they perform one inſeparable effect, ſo two ſouls joyned together do conſpire to make up one effect. And there are alſo examples hereof in Plants; whereof *Scaliger Exercit.* 106. *ſect.* 6. thus writes: *I wil tel you a greater matter which wil more advantage you in ſearching out the manner of Generation, than to know all unprofitable rules and Laws of Cylinders. Set three Date Stones, and ſo many Palmes wil thence grow up, and ſo diſtinct, as the Stones themſelves were; and theſe three branches wil grow together and become one Palm with one Stock. And of theſe Stones no otherwiſe ſet than aforeſaid ſprings the Palm-tree as* Theophraſtus *informs us: one ſtock in number ariſing from three Trunks, ſeparated in Original, Matter, Quantity and Place.* So far *Scaliger*. For every ſtem and each palm firſt ſpringing out of the Earth hath its own ſoul: yet nevertheleſs theſe three Palms grow into one numerical Palm; which is not only to be ſeen in the palm, but in the Ingrafting of all Plants in which the Stock on which the Branch is ingrafted hath its own ſoul, alſo the Branch hath its ſoul: of the branch and ſtock one Plant and Tree is made and furniſhed with one only ſoul. And not only of the ſame ſort, but different ſouls are alſo joyned, as was ſaid, and may be ſeen in the generation of a Mule, in which the ſouls of an Horſe and a ſhee Aſs are joyned, as is manifeſt by the ſhaping of its parts; alſo in the ingrafting of a Pear upon an Apple, and of other Trees of ſeveral ſorts. For where the power and faculty of the ſoul is, there is the ſoul it ſelf: but in the conformation of a Mule the actions of each ſoul, both of the Horſe and the Aſs, are apparent. And therfore here alſo with *Scaliger* in *Lib.* 1. *de Plantis*, we muſt ſay, *where the thing it ſelf is apparent, if Opinion contradicts the ſame, we muſt ſeek a reaſon, and not be Ignorant of the thing.* And therefore whatever objections are made concerning one ſeed whether of the Male or Female, they are of no moment. For neither is one ſeed alone ſufficient for Generation, but both are neceſſary.

The Conjunction of ſouls abſurd.

Now the Generation of Animals is twofold; for ſome bring forth Eggs out of which living things are hatched; others conceive live things within themſelves and afterwards bring them forth. To each of theſe Generations the ſeed of the Male and Female are requiſite, and of them joyned together the Conception is made in which the ſoul is the principal cauſe of the ſhaping of the young Creature. For al the reaſons which prove that the ſeed of Plants is animated, the ſame do alſo firmly prove that the ſeed of Animals is animated; and the reaſons which prove that generation is made in Plants by the animated ſeed, the ſame reaſons demonſtrate the ſame thing in Animals. Some indeed do count it a vain way of reaſoning, to argue and demonſtrate the Generation of Animals from the Generation of Plants. But in my judgment they are therein much deceived. For ſince Generation is an action of the vegetative faculty, or of the natural faculty as Phyſitians call it, and that faculty is moſt vigorous in Plants, the way of generation in Animals may thereby wel be proved. For ſince all Generation is performed by communication of the Soul and the Body, or as *Zabarella* ſpeaks, every Generator when it Generates does communicate ſome of its matter and ſome of its form, and this communication of matter and ſoul is moſt conſpicuous in Plants, ſo that it can no waies be denied that Plants communicate their ſouls by Seeds, Branches, and roots, and that no Generation is made without the ſoul be communicated by the Generator, Why ſhould I not hold that it betides after the ſame manner in Animals? And ſince in Plants the preſence of the form in the ſubject is collected by firm demonſtration from their operations; and in the ſeed of Animals the operations of the ſoul, Attraction, Formation, Augmentation are found, we juſtly conclude that the ſoul is preſent therein. And ſince no Agent can immediatly concur to the production of a living Creature, but it muſt have the ſame degree of life formally; and the ſeed of Animals by its own proper virtue, without any new aſſiſtance of the Generator, or any motion or direction thereof, yea ſeparated therefrom in place, and many times alſo in time, does produce a living Animal, and is the principal and immediate Agent in the production of the young one; it muſt of neceſſity have formally a like and univocal Soul. And this appears both in ſuch as breed Eggs, and living things.

The Generation of living Creatures twofold.

The Seed of Animals is animated.

For in the firſt place, as concerning Eggs, that the ſoul of the future Animal is already in them, this ſhews, that as ſoon as Eggs are cheriſhed by a convenient Heat the ſoul in them begins to rouze it ſelf and forms an Animal, like that from whence the Eggs came. Nor can the Generator be the cauſe of this form; ſince it is many times dead when the Eggs are hatched

Eggs have a ſoul in them.

ched; nor can any other univocal cause be so much as imagined. That the Eggs of Silk-worms are hatched by a temperate heat, *Hieronymus Vida* does testifie in the first Book of his Poem of Silk-worms.

Nor are the Silk-worms Eggs hatched one way
Alone, for some do in the Sun-shine lay
The little seeds, until they hatched are.
Nor shouldst thou be asham'd, O! Lady fair,
To give them (wrapt up in thy Lilly Breast)
Betwixt thy Rosie Nipples a warm Nest:
If thou do'st love to wear a brave silk Gown:
For in a day or two, thou up and down
Shalt see the wonderous little Worms to creep,
Who in their Eggs did lie before asleep.

'Tis commonly known that Hens Eggs are hatcht by Ducks, and Ducks Eggs by Hens. Yea and *Jul. Cæs. Scaliger* relates that in the City of *Grand Cairo* Chicken are hatcht by the Heat of a Furnace. In all which waies there can be no univocal Agent assigned, but the soul which lies hid in the Egg. For the Eggs of Animals being of a middle nature betwixt the seeds of Plants and Animals do agree with both in some things, and in other things they differ: they answer to the seeds of Plants herein, because they contain in them both the soul and the matter of the future yong one; moreover the true seed is covered with a Bark and Membranes: but herein is the difference, that the seeds of Plants when they are committed to the Ground, from it they draw the matter which is necessary to form the body, and of the matter of the seed the first smal Roots and sprouts only are framed, the other parts of matter being drawn out of the Earth: but in Egs since the soul is so barricadoed and shut up in Skins and Shels, that it can draw nothing from without, and in the mean while the yong one is in a manner perfectly formed in the Egg. Eggs do not only contain soul and matter fit to shape the first rudiments of the yong Creature, but also matter necessary to shape so perfect a Body and to nourish the same. And with the seeds of Animals they do herein agree, that the seed is first of all bred in the Stones or the parts analogical to the Stones, and that the seed is perfectly cast by the Male into the Womb of the Female, which is not so in Plants whose seeds are expoied to many external Injuries, being out of the Earth their Nurse. And herein such as breed Eggs differ from those which bring forth living Creatures, in that the seed of the Egg-bearers is not perfected in the Womb of the Females, as the seed of such as bear live young ones is, but is perfected without, and therefore their seed does not remain liquid like that of the others, but had need to be governed by an external help and receptacle.

Eggs compared to the seeds of Plants.

Now the Generation of living Creatures from Eggs is not after one manner. For some are excluded by the Females while they are Egs, and after become Animals being cherished by external Heat. But in Crabs the Eggs stick fast to the Mother, and Crabs are generated in them whiles they are there sticking.

Animals which bring forth quick young ones.

But such Creatures as engender within themselves or in their Wombs, do all generate by the meeting together of the seed of the Male and the Female; which seeds as soon as they are conceived in the Womb the souls displaies it self and begins to frame it self a fitting mansion house, which being perfected is called a living Soul Live-wight or Animal. Now the seed of both the Parents although it hath the soul in it, and therewith lives of it self, yet is it no Animal, nor can an Animal be made thereof unless both are joyned together. That thing is animated which hath a soul in it, and lives thereby of it self: and that is an Animal or living thing which is furnished with a Soul and Body that hath all the Organs requisite to such a Creature. But the seed of the Male or Female alone cannot become an Animal, but the Conception which consists of both seeds, or of the seed and menstrual Blood, becomes an Animal. And therfore the Male does neither Generate in himself, nor doth he engender an Animal essentially perfect, nor does he ingender alone.

The Seed of Animals is animated.

Now that this seed of Animals is animated or hath the soul in it, the Conformation or shaping of the yong one shews. For either the yong is formed by a cause without the seed, or within it. Not without it, for none can be imagined; or if any, it must be the Womb. But that formation does not spring from the Womb is the common opinion of learned men, nor is it destitute of reasons to justifie the same.

Among

Among late Writers (truly) *Johannes Gallego de la Serna, de princip. generat. Lib. 3. cap. 20.* endeavors to prove that the Soul of the Mother is the principal cause of the Organization and Animation in other Animals, and of the formation and union in Man. And to prove his own Opinion he alleadges certain Authorities of some Philosophers and Physitians; but contrary to their own evident Understanding, which therefore I list not to set down in this place: And the Reasons which he uses are evidently frivolous. *The yong ones of Animals are not shaped by the Womb.*

The first is, That there is no Organ in our Body, which by its own similitude and natural Inclination hath the power of attracting any useful substance for attractions sake alone, but to enjoy the same, and consequently to change the same; but the Womb hath a power and most vehement Inclination to draw to it self the matter of the child; *ergo* it draws it not only for attractions sake, but to enjoy, and consequently to change the same. But I answer to the minor, that it is false that the Womb in Creatures that have blood does draw to it self blood necessary to form the yong one; but the soul which is in the Seed draws the same, and therefore also changes the same. For as in Plants the seed cast into the Earth, or a branch or bulb set therein, does first form and produce roots by which it draws nourishment out of the Earth; so the soul in the yong one in the Womb forms the umbilical Vessels, by which it draws blood and spirits.

Moreover he conceives the Generative Faculty hath need of a peculiar Organ, and that the Womb is that Organ, since in the whol body there is none like it so accommodated for such an action.

But both of these suppositions are false. For in the first place the changing faculty is not Organical, nor is it performed in a part as it is Organical, but as it is similar, and furnished with its innate heat. And although the stomach and Liver, and other parts, which do change and generate some substance are Organical: yet they change not nor generate any thing as they are Organical but as they are similary. But they have their Organical constitution for their more convenient Reception, Retension, and Expulsion. So the stomach hath the upper Orifice which receives the meat and drink, the Cavity wherein it holds the same the lower Orifice, by which the generated *Chylus* is sent forth. But Concoction is performed in the stomach inasmuch as it is a similar part, and furnished with its Natural Heat. Again, that presupposition is false, That the Womb does change and inform that blood which comes in for the formation of the Child; since that is done by the soul in the seed. For as when the yong one is formed it hath in it self a nutritive and growing faculty which does not proceed from without: so it is also in the formation or shaping of the said yong one. But the Womb only affords the place wherein the formation is made, and al the Organical Constitution thereof is contrived to that intent and purpose.

On the contrary, There are most evident Reasons which prove that the Womb of the Mother does not perform the shaping of the Child, and that it does not give the soul to the Child, For in the first place, if the Womb did shape the Child or yong one whatever, the Male should not communicate the active Principle of Generation, but only the passive. Yea, and the Female alone should be the cause of Generation, as bestowing both matter and form, and so the female might conceive in her self without a male. Secondly, no reason could be given why the yong one should be sometimes like the Sire or Father. Thirdly, why should not Females be alwaies generated, and how comes there to be Males? Fourthly, That which performs the work Formation must needs immediately touch the Child or yong one: but the Womb does not immediately touch the yong one, but Membranes come betwixt it and the Womb, and those watry Excrements contained in the Membranes. For whereas *Joh: Gallego* conceives it conveighs its vertue to the yong one through the Membranes themselves, it is absurd, nor are the Membranes parts of the yong one, as *Gallego* would have it: Much less can that vertue pass through the Excrements. Nor is that of any moment which he faies of the Torpedoes benumming a Mans hand who touches it only with the end of a very long rope, and that the Load-stone moves Iron through a thick board. For those actions are performed by spiritual Species, as was said before in the Second Discourse, chap. 4. of this Treatise, which are as a Ray continually thrust forth, as *Jul. Cæsar Scaliger, Exercit.* 344. *Sect.* 5. speaks. But the concocting and changing and forming Faculty is immanent, nor does it pass from one subject to another, and remaining in its own proper subject, performs its operations, but does not tranmit its force through the Membranes and excrements out of the Womb. Indeed *Johannes Gallego* conceits that it is the part of a blockhead to doubt, Whether the Soul of the Mother can animate the internal parts of the child, although they are covered with Membranes. But I am of Opinion the quickest wit in the World cannot conceive how the Soul being absent and distant in place, can animate the yong

one. For suppose the Womb could work some alteration thereupon, through the Membranes and Excrements of Water, yet could it not cause animation.

In the seed it self is the Cause of Conformation.

Therefore we must needs hold that the Cause of Conformation is in the seed it self. Which is the common Opinion of learned Men, viz. of *Aristotle*, 2. *de generat. animal. cap.* 1. 3. 20. 1. *de generat. animal. cap.* 20. 21. 4. *de generat. animal. cap.* 1. and elsewhere. *Galen*, *Lib. de format. fœtu. cap.* 2. 3. 5. 14. *Lib.* 1. *de sem. cap.* 8. 18. 2. *de sem. cap.* 1. 2. 5. 14. *de usu partium, cap.* 7. 8. and others. And it hath questionless strong reasons to support the same. For in the first place, since Conformation is a Natural act, it proceeds from an Internal principle, not an external. Secondly, conformation begins in the seed equally, and al the parts within and without are equally conformed. Thirdly, since in Birds which breed Eggs the principle of Conformation is internal, no reason can be shewed why it should not be so in al other Animals.

The soul is the cause of the shaping of an Animal.

And if you now enquire what that internal Principle is, no other can be assigned save the Soul. Some say it is *logos Plasticos*, or a formative Understanding or Faculty: but unless thereby they understand the soul it self furnished with a formative Faculty, this Opinion cannot hold, and hath been sufficiently refuted before, chap. 5. Others hold it is the Native Heat: but neither is that the principal Cause of Formation. For so noble an action which al Philosophers cannot sufficiently admire, can only be ateribed to a quality. And heat is only a common Instrument, nor can it give to al parts their quantity, figure, and number, and out of question no quality can act unless it be directed by a principal and superior faculty, of which there is need in this case.

Nothing else therefore remains which can be the cause of Conformation in the Seed, save the Soul it self. Which while *Thomas Fienus* denies he is in great Error, *quæst.* 5. *concluf.* 6. and in the first place he hath not indeed rightly stated the Controversie. For whereas he ought to have disputed concerning al Souls living, or al Animals, he contrary to the Rules of Demonstration, goes about to demonstrate an adjunct of the whol kind of Animals, touching one sort, viz. Man-kind. For it is not a thing proper to Man alone to generate from seed cast into the Womb, but common to al Creatures which bring forth yong ones alive. And in the beginning of Quest. 5. he does not rightly form the Question, where he writes. The Question here is not, Whether the Soul brought into the Seed after Conception is the Efficient Cause of Conformation? but whether the Soul pre-existing in the Seed before the Conception, and bred in the Testicles of the Parents is the Cause. For there is no Question concerning the latter; but this is the Question in controversie; Whether the seeds of the Male and Female joyned together in the Womb, have an intrinsecal formative Faculty (which he grants) and consequently a Soul (for that necessarily follows) in them.

The Controversie touching the formation of the yong one stated.

For let us put the case that in a Man the Soul is introduced and confused by God: yet since in Bruits there can be no such Infusion it must needs be presently in the seed, and that communicated from the Parents. And this is sufficiently proved by one Argument which *Fienus* himself brings, so that there is need of no more, and that is this; that which shapes the body is within the Seed, as he proved, Conclusion the third. That which shapes is some Soul; for shaping is a proper power of the Soul. *Ergo*, there is a Soul within the Seed, or a Soul of the Seed: for that which he answers (as was said before, chap. 6.) is of no moment. *I confess* (sales he) *the Premises are true. But I deny the Consequence. It is indeed rightly inferred that there is some Soul in the Seed, but not that it is the soul of the Seed. There is indeed a Soul brought into the Seed after that the Seed is conceived in the Womb, or planted in the Earth, or the Egg set under the Hen, when all things are put into act; but that is not the Soul of the Seed, or which did pre-exist in the Seed, or which was bred in the Stones, the Tree, or the Hen, but the Soul of the yong one conceived being afterwards introduced thereinto.* For suppose indeed that the Soul is introduced into humane Seed; yet into the Seeds of Plants, the Egs of Hens, and the seeds of Bruits, 'tis false to hold that the Soul is afterwards introduced. For what introduces the Soul into the seed thrown in the ground, what introduces it into an Hens Eggs whiles a Duck sits over them, or while they are hatched by the heat of a furnace? Here can be no cause assigned by which the Soul should be introduced. And if the Parents should not give the Soul, but some external thing, like should not ingender its like. And what need is there I pray you (in this case) to multiply things to no end, and to hold two Souls; one which is the Soul of the Seed, or which did pre-inexist in the Seed, and was bred in the Stones, or the Tree, or the Hen, and another introduced afterwards. And he contradicts himself in this point, whiles in Conclus. 6. he writes: *That the shaping of the Seed in the Earth is not essential generation it self, but only the perfection of the new Plant already constituted and generated upon the Tree; and the*

'Tis proved that the soul in the seed is the Cause of Conformation.

When a Plant is generated.

the bringing thereof now to a perfect act, which was before constituted only in an imperfect act; nor is it any matter what the vulgar people think or call Generation, or what they do not so call; nor what agrees to their understanding, but what agrees to the Truth. For the common people are ignorant of Philosophy, and knows not when and where a Plants form is truly produced, nor when is the Essential generation of a Plant; and knows not how to distinguish between the first act and the second, betwixt that which is imperfect, and that which is perfect: and therefore they take one for another; *and conceive that a Plant is then first generated when it is perfected and operates, and when it brings forth Roots and Leaves; whose production is not the Generation of the Plant, but the operation and perfection thereof, being generated before.* So far *Fienus*. And in very deed if *Fienus* as he rightly understood the presence of the Seed when Conformation is made, so he had also known the propagation and original thereof he might easily have freed himself from all doubts besides. For the truth in that point being discerned al doubts are easily resolved.

For although they that think otherwise do alleadg many things: yet they can bring nothing solid and firm for their Opinion: which knowing, that they might abuse the Reader contrary to the Laws of Demonstration, such things as they should dispute of the seed and formation of Animals in general, those they dispute in particular touching the Soul and formation of Man; which when they are examined in general and in their own place they prove of no force. For many being of Opinion that the soul of Man is not propagated from his Parents, but infused by God when the body is formed, and the same being also immortal; al those absurdities which are objected against the Animation of Seed from the Prerogative of the Humane Soul do fal to the ground if they be propounded in general so as to concern bruit Beasts also. For they are not able to shew whence proceeds the soul and formation of the Body of an Horse, a Lyon, a Dog, unless the Soul be derived from the Parents with the Seed; nor can they tel us who it is that begins the Delineation of the yong one in al Animals, or why it should be necessary that the said Information should be begun by one, and perfected by another. But especially they are nat able to shew how out of the Eggs of Birds yong ones of the same kind are hatched, especially by a Bird of another kind sitting on the said Eggs, or when they are hatched by the heat of a Furnace, unless the Soul were already in the Egg. And therefore since in Bruit Animals those Arguments are of no force, the most of those also which are urged concerning the Generation of Man wil also be of no force. And although some distinguish betwixt the Conception and the Seed, and cal that white substance bred in the stones the Seed, which is shed into the Womb in the time of Copulation; and that Body bred of the Seed in the Womb the Conception, wherein there are some lineaments of the future Animal already drawn; yet they themselves cannot shew a Reason whence the Soul in Bruits (for here we wil set aside the Humane Soul, thence thereabouts, for the reasons aforesaid there is a peculiar dispute) should come into the Conception, if it were not in the Seed before; nor tel us what cause began that first delineation and figuration of the parts of every Animal. For whereas *Johannes Gallego de la Serna*, saies it proceeds from the Womb, that is altogether false. For so the Female should only generate, since she alone gives the soul, and the Male affords only the matter.

But let us see their Objections. In the first place many indeed Object, and therein also triumph, That nothing is animated but a body and its parts; but the Seed is an Excrement and a certain superfluous moisture bred in the stones, being just like the Chyle in the stomach, the blood in the Liver and Heart, and the milk in the Dugs. But in good deed this Argument of theirs is of no weight, as shal be also shewn hereafter in Chap. 14. For in the first place, they beg the Question, and this very thing is a part thereof, whether only the parts of the body, or the seed also be animated. For although the Seed is bred in the stones, as Chyle in the stomach, and is no nutriment of the body; yet it does not thence follow that it is an Excrement. For there is a third thing generated in living Creatures, viz. the fruit or seed, cal it which you please, which the seed of Plants does evidently declare. For some do make exceptions and say, that there is a difference betwixt the seeds of Plants and Animals, and that the Seed of Plants is not like the seed of Animals, but like the Conception made in the Wombs of Animals. But suppose it so to be; yet thereby is proved, that there is also somwhat bred in Animals which is neither a part of their Body, nor a Nutriment, nor an Excrement. Nor does that prove the contrary which *Johannes Gallego de la Serna* objects, *de princip. generat. Lib. 2. cap. 5.* while he writes that the seed of Animals cannot attain to that ultimate disposition to the Introduction of the Soul, which those parts of the same substances have attained, which have been turned into the substance of the parts; and that the seed hath only received from its organ assimilation, such as the concoctive Faculty was able to

A refutation of arguments brought against the presence of the soul in the seed of Animals.

The seed is not an excrement.

to give it, and such as Milk hath received, and that therefore it remains inanimate. For they are meer beggings of the Question, and the seed of Plants does demonstrate the contrary. For if the seed of Plants could receive that disposition necessary for the propagation of Plants; why cannot the seed of Animals receive the same? And milk it self which *Johannes Gallego* brings for an example, evidently declares that somwhat may be ingendred in the bodies of Animals which is no part of the body nor its Aliment (for the Mother is not nourished with the Milk she breeds) nor a meer Excrement: such as seed also is, which is not therefore bred in the stones by the concoctive Faculty only that it might be voided forth as al Excrements are, but therefore and to this end that by it a new Individual might be generated, and so the kind might be preserved. And therefore though the Concoctive Faculty does not animate the Seed, as neither in other parts does the aliment receive the Soul from the Coctive Faculty: yet after the Seed hath received from the Concoctive Faculty such a disposition that it can be a fit subject for the Soul, the soul which is in the animate body does communicate it self thereto as wel in Plants as Animals: which after it is separated from the Parent, by vertue and power of the soul which it possesses and hath received from the Generator it is able to constitute a new individual, or particular distinct live thing. For in them also the seed is first elaborated by the Concoctive Faculty; and when the seed is wel wrought and ripe, then the soul communicates it self thereto. The same comes to pass in Animals, nor is there any reason to shew that it is otherwise; save that in Animals as being more perfect there is a more labored preparation, and both the male and the female communicates somwhat to the Constitution of the yong one; nor is the seed cast into the Earth, but into the Womb. Nor let that trouble any one that the seed of Animals which bring forth quick yong ones, is of a different Nature from the seed of Plants, and that the seeds of Plants are wonderously and variously shaped: but the seeds of Animals represent only a Liquor like milk. For seeing the seeds of Animals are presently cast into the womb of the Mother, and cherished thereby, and therein receive blood necessary to nourish the yong one; there was no need that they should be fenced against external Injuries, by external coverings as the seeds of Plants and Eggs also are.

How the Seed is animated.

The difference of the seed of Plants and Animals.

Howbeit in the Womb it self the Seeds of Animals do frame many things which are necessary for the Formation and augmentation of the yong one; such as are the Coats which infold the same, the Umbilical or Navel Vessels, and such things as belong to these. Finally, in such Creatures as produce Eggs, because the Eggs were to be kept long before the Chicken are hatched, and that is not performed by the heat of the Womb, but by an external Heat, yet they are covered with shels after the same manner as the seeds of Plants. For Eggs do herein agree with the seeds of Plants, that as in Plants to the marrow or pap which is properly the seed, other things are added either to guard the seed, or to make food for Man-kind, or for other uses; so also in Eggs other things are found besides the true seed. Which does even hereby appear, That the Eggs which the Hens lay untrodden by the Cock have al that is food in Eggs, yet are they untruitful because they want the seed of the male. Which happens also in Insects. Al female Silkworms without difference yield Eggs: but such as have not coupled with the male al their Eggs or seeds are unfruitful. Yet this difference there is betwixt the seeds of Plants and Eggs, that of those things which are added to the true seed, the Plant is neither formed, nor nourished, nor augmented; but the seed draws nourishment to it self out of the ground, save that (as was said before in Chap. 8.) the first rudiments of the tender Plant do draw their Nutriment out of some part of the Pulp; but Eggs, because without the Womb and out of the Earth, they become a perfect Animal, and the seed (of which at first the Chick is formed) is covered with a shel that it can draw nothing from without: in the Egg there lies already so much matter as may suffice to perfect the Chick til such time as it is hatched.

The Objections of Joh. Gallego.

In what sense the seed is more imperfect than the Generator.

Secondly, *Johan. Gallego de la Serna, Lib. 3. de princip. sem. cap. 5.* promises that he wil prove that the Seed is only a material principle of Generation, that no man unless he be blockish and stubborn, wil hereafter dare to deny the same. But he performs not his great Promises, and those are sleight Arguments which he brings. For in the first place he saies that the Seed is much more imperfect than the Generator, and the yong one to be generated. For it is a certain Excrement of the Generator. But I answer, That the seed also of Plants which he grants to be animated, is more imperfect than the Generator and the Plants generated therefrom, not because it hath no soul, but because it hath no formed Organs which lie hid nevertheless aptitudinally in the seed, which contains in it an Idea or Plat-form of them, and they are fabricated by the Soul it self. But that the Seed should be only an Excrement was before refuted.

Again,

Again, He conceits that the virtue of the same sort cannot be received in a matter of a distinct sort. But the form of the seed differs from the form of any Individual of what sort soever. But he does not rightly understand the nature of Seed. True indeed it is the soul cannot persist in a perfect manner, nor last long save in a body fit for it, and furnished with such Organs as it hath need of, but that it cannot be propagated by a different body, viz. the seed, and abide therein so long til it have generated and built a Body for it self, experience it self teaches that to be false, and he himself granted as much before in Plants. For there is indeed one soul in the seed, and in the Animal ingendred thereby: but yet that which is in the Animal differs not from that in the seed, save in the accomodation and perfection of Organs. Verily neither the seeds of Plants, nor the Bulbs, nor the Rootes, nor the Branches (if you consider the perfection of Organs) are of the same condition with perfect Plants, for example sake, the seed and bulb of an Onion after a sort is not a perfect Onion; the seed of Poppy after a sort is not an entire Poppy Plant; the Branch of a Pear Tree is not a perfect Pear Tree: yet in all these there is the perfect soul belonging to that sort of Plant. Nor is the matter in the seed and that in the young one of a different but of one and the same sort.

Whether the Organs introduce the soul.

Thirdly, *Gallego* does also very much urge this Argument, 1. *de princip. Generat. Lib.* 3. *Cap.* 18. when a thing is by Nature & Art so made for some other thing that the latter cannot exist without the former, it must needs be that *that* which is made for the necessity of another should go before it in time. But the matter and all its dispositions are for the form: *Ergo* they ought to precede the same in time. For the form should never be united to the matter save for the Instrumental actions, *Ergo* the Organs and necessary Instruments ought to precede before the Introduction of the form, and the whol preparation of the matter necessary for the actions of the soul cannot any waies be made by the same form whose actions they are, but by the Agent to which the whol work of Generation is committed. For to the same Agent to which it belongs to Introduce the form into the new matter, it belongs also before its Introduction so to prepare the matter that by no means it can be received in another, nor the matter it self can receive the active form. But both the Major simply taken and the Minor are untrue, and the proof thereof is false. That the Minor is false, both the formation of the Body of Plants, and Nutrition and Augmentation of Animals do teach. For first of all, when the seed of a Plant is cast into the Earth, or a Branch or Root or Bulb is set therein, there is no other Agent which can first form the Body and Instruments fit for the soul, but the soul in the Seed, Bulb or Branch, does first form the Roots, by which it draws out of the Earth convenient matter to form a body fit for it self, and of it forms the parts of its own body. Why then should not the same thing be done in Animals? Yea the thing it self tels us that the same is done. For the seed being received into the Womb, the Soul first forms the Membranes in which the seed is included, and then the umbilical Vessels by which it draws blood necessary to form the body withall. Which thing also Eggs do testifie, which being cherished by any heat whatsoever Birds are thence produced. Where no cause can be so much as imagined which should fit the matter to receive the soul save the soul it self which is in the Egg. Again, The proof of the Minor is false, which builds upon that never granted Hypothesis, that after the ultimate disposition of the matter then the soul is educed and springs forth. This indeed is true, that al the organization (as he phrases it) is for the form, that is to say, that the form may have fit Instruments whereby to act; but that the soul could not be there in its first act before it can perfectly operate by the Organs can no waies be proved.

Fourthly, Others object that if the seed of an Animal (for example of an Horse) hath actually the soul in it, the seed of an Horse is an Horse; since the form of a thing being supposed, three things are supposed, the Essence of that thing, the Name, and the Operation thereof. But here is no consequence at all. We grant indeed that the Essence of a thing does chiefly depend upon the Soul, and consequently the denomination, and that from it the operations flow: yet the soul is not the whol thing, but a part thereof. And therefore the other part being wanting, viz. the organical body, the soul cannot be called an Animal.

Whether the seed be actually animated?

Fifthly, Some do Glory in this Argument, viz. that it is a metaphysical Principle, that the same thing cannot be at once actually and potentially. Since therefore the seed is potentially an Animal, it cannot be actually an Animal. But there is no strength in this Argument. For not to dispute in this place of the genuine sence of that metaphysical Axiom, since the same thing in divers respects may be said to be both actually and potentially: I shall only speak to that, whereas the seed is said to be potentially an Animal; and I Answer, That this Argument is drawn from Authority, and that which upon a like occasion the most learned

learned *Thomas Fienus* said from *Plato*'s Charmides; it is not to be regarded what any man saies, but whether he speaks true or not. Again saving the Authority of *Aristotle*, the most renowned *Casparus Hofmannus* hath wel written, as before we hinted more than once, *In tract. de formarum Origine, rat.* 2. *Aristotle* hath so often said that the seed is an Act, that it is the part of a very unskilful Person to urge only those places where he saies it is potential. For seeing (as was said before) that which moves is actually, but the animated seed actually moves, certainly the seed must have a certain act which moves. This act is *that same beginning of Generation and Motion* (as *Aristotle* cals it) 1. *de Generat. An. cap.* 2. *and the beginning of the shape which turns the Courses into its own likeness.* 1. *de gener. animal. cap.* 20. & 4. *de Gen. cap.* 1. 1. *de part. animal cap.* 1. And lest any should feign I know not what spermatick Principle (of which we spake *cap.* 5.) different from the Soul, he terms this Principle, *a member or part of the Animal, which is immediately in the Seed*, 2. *de gen. anim. cap.* 1. And whereas *Aristotle* sometimes saies, that the seed is potentially animated; this he therefore said, as *Scaliger* wel observes *Exercit.* 6. *sect.* 7. not because it needs another substance to draw forth and perfect the same (for so it were but begun) but because it wants perfect Instruments which are in its power to make. Which also *Zabarella* held, who (*de Mente humana cap.* 9.) expressly writes, that the Seed hath a Soul potentially, because its soul does not yet work by its proper Organs.

Sixtly, They say if the Soul frames its own Mansion house, (as is asserted) Why does it not presently frame the same in the seminary Vessels? But let them tel us, why the Soul of a Dog does not see in the Dogs Tail, nor produce Seed, nor form a Body in the same place. For where the Place and Organ is wanting, there no Operation can be performed.

What is the most common action of the soul.

Seventhly, They say if the seed is actually animated, why is there no nutrition discerned therein, which is the most common action of the Soul? But it is denied that nutrition is the most common action of the soul, for vivification is its most common action. For Nutrition belongs only to the Body already formed, and when Nutriment is at hand. Hence the seed of Barly, Wheat, or other Grain lives in the Granary, which *Johannes Gallego* does grant, but it is not nourished, because it is not in a convenient place wherein it may be cherished and receive aliment.

Whether souls are united.

Eighthly, They object if the seed be animated and both the Parents contribute the same, the soul wil be a thing compounded of the soul of the Father, and the soul of the Mother. But mixtion and composition as hath formerly been said does only belong to things of different sorts; but if things joyn which are of the self same sort there is no composition; nor is the fire which arises from many flames united called compound: and the example of Palmes was formerly alleadged out of *Scaliger*. And that example also *Fort. Licetus* (*de perfecta constitutione hominis in utero chap.* 8.) alleadges; that by ingrafting when a branch is put into the trunk of a Tree, two and sometimes more souls do joyn, and yet the Tree is but one, and hath but one soul. Whence that fals to ground which some do urge touching the Commigration of two Essences, and the subsistence of two Essences in one, which they count absurd. For all these things are true only of compleat Essences and which can subsist of themselves; but not of those which are ordained to make up the perfection of one thing.

Whether the Parent in generation looses any of his soul:

Ninthly, Whereas they count it absurd that many souls should proceed from one Parent, and that the Parent in every time of copulation should lose a part of his soul, all this proceeds from their ignorance of the nature of the soul. The soul (as hath been said before) hath no parts properly so called, and it is deprived of no part thereof, but remaining stil the same does variously multiply it self. For though one Tree in one Summer do produce a thousand Apples, and each Apple hath sundry seeds, and out of each of them a like Apple-tree wil grow: yet the soul of the Apple-tree is not diminished but remains totally the same. And the same holds in Animals. And therefore it is more decent to search and admire the wonderful works of God than to calumniate the same. And all those absurdities which are objected against the wonderful work of Generation are nothing but disparagements of the works of God proceeding from Ignorance.

Finally, That the seed is animated, *Thomas Fienus* does (*de format. fœt. quest.* 5.) thus Impugn: Neither the Blood (saies he) nor the Spirits are animated: *ergo*, nor the Seed. He proves the Consequence because they are produced in parts much more noble than the Stones are, viz. in the Heart, the Brain, the Liver, which if they could not impart the soul to the Blood and Spirits, neither can the stones. But the Principal parts have their dignity. And, therefore although the Liver, Heart, Brain, do generate Blood and Spirits:

rits: yet for the Generation of Animals the ſtones have a peculiar ſeed making faculty, ſuch as no other parts have, that of the blood and ſpirits bred in other parts they may form a peculiar matter which is the fit ſubject for the ſoul to be propagated in, which is termed Seed, which is much more excellent than the Blood ſince it is the fruit of an Animal, and the Blood is only the nutriment.

Chap. 10. *Of the Propagation of the Humane Soul.*

AND hitherto we have demonſtrated by firm reaſons (as I conceive) that Plants and bruit Animals are generated by Seed which hath a Soul in it communicated from the Generator; which lying hid in the Seed forms it ſelf a fit Manſion houſe according to the kind of Plant or Animal from whence it came. It remains that we ſpeak of the Generation of Man, concerning which Authors are of divers Opinions. Some had rather ſuſpend their Judgments than determine any thing in ſo difficult a matter. Others hold that as the Body, ſo the Soul of Man is propagated from the Parents into the Children by vertue of the Divine Benediction. Others conceive that new Souls are created for every perſon by God, and infuſed into their Bodies after they are formed, and ſo they aſcribe the production of Souls immediately to God. As to the firſt Opinion, I acknowledg indeed the difficulty of the matter, and I confeſs that it is here dangerous to determine any thing. Howbeit ſince in matters difficult 'tis praiſe-worthy to do a mans endeavor, and we ought to labor with al our might to know the Truth, ſetting aſide the firſt Opinion we ſhal examine and weigh the two latter. And in the firſt place I am not indeed ignorant what Priviledges the Soul of Man hath, viz. To it alone immortality is granted by God, which is denied to the Beaſts, and it alone ſhal be partaker of eternal Bleſſedneſs. But whether the Propagation thereof by the Seed can derogate any thing from this Prerogative of Mans Soul is a queſtion. Nor would I (truly) hereabouts hatefully contend with any man, but I allow every man to abound in his own ſence, and to enjoy his own Underſtanding; but if I may ſpeak my own mind, there are three things which lie me in hand to prove. Firſt that it is more probable and likely that the Soul of Man is propagated from his Parents by vertue of the Divine Benediction. The Second is, That whether we hold the Soul to be created and infuſed, or to be propagated and traduced from the Parents; yet nevertheleſs we muſt hold that the Soul is preſent in the Seed at the firſt conception, and when the ſeed of the Father and Mother are joyned together in the Womb and retained, and as ſoon as ever the work of ſhaping the Body begins, and that no other efficient Cauſe can be aſſigned which performs the work of Conformation, ſaving the Humane Soul it ſelf. Thirdly, though I know great Authors differ in this point, yet (if ſetting aſide Authority, Reaſon ſhal be only conſidered) I ſhal demonſtrate, That ſcarce any ſolid Reaſon can be brought againſt the Propagation of the Humane Soul by the Seed. And whereas this point is diſputed both with Philoſophical and Theological Reaſons, I ſhal not put my Sickle into other Mens Corn, but uſe only Philoſophical Arguments. And if any man wil defend the other Opinion by Theological Reaſons it concerns him to ſee and ſhew how theſe Arguments may be anſwered. Which if he ſhal do I wil not be wilful in defending mine own Opinion, but ſhal willingly follow him that ſhews me better. In the mean time, and til that be done, as far as I am able to judg in this darkneſs and weakneſs of Humane Underſtanding I cannot think otherwiſe. But I give others free leave to think otherwiſe. For I deſire not to be a Dictator, but only to propound my Opinion as wel as others do theirs.

Divers Opinions touching the original of the Soul of Man.

The propoſition of what is to be ſaid of the original of humane ſouls

Now that the Soul is propagated from the Parents into the Children by the Seed is firſt hereby proved, in that (as was ſaid before) like begets its like. Which *Ariſtotle* evidently ſhews, 2. *de Anima, chap.* 4. *text.* 34. where he thus ſpeaks: *This Operation is of all others moſt natural to living things; I mean to ſuch living things as are perfect, not maimed, and which are not born without ſeed: every thing I ſay to beget another like it ſelf, an Animal an Animal, a Plant a Plant, that thus they may continue alwaies, and attain as much as may be a Divine Condition.* For ſince God made every thing in its kind perfect, but Man moſt perfect of al; verily he could not be called perfect, but ſhould according to *Ariſtotle* be reckoned amongſt maimed things if he could not beget another like himſelf, and that intire. And therefore both according to Philoſophers and Divines, Man ingenders Man, and the whol Man an whol Man, which could not be if the Generator did not communicate the Soul. For ſince a Man conſiſts of Body and Soul, if the Soul ſhould not be communica-

The Humane ſoul is propagated into the children by the ſeed.

ted by the Parents, a Man should not engender a Man. Also that a Man communicates his soul to his Child is altogether agreeable to the holy Scriptures. For God, *Gen.* 1. 18. said to Man (as wel as other Creatures) when he blessed him, *Encrease ye and multiply:* by vertue of which Benediction the whol Man ingenders an whol Man; which could not be if the Soul were infused from without. Of which more largely in Chap. 11. For what ever pertains to the Essential Integrity of a Man that is propagated by Generation. But not only the Body, but the Soul pertains to the Integrity or entire being of a Man. And therefore the Soul also is propagated by Generation. Whence also *Damascen, Lib. 4. de Orthodoxa fide, cap.* 7. defines Generation to be the Procreation of an Individual of like substance by the Copulation of a Man and a Woman. Nor is the beginning of the Soul of Man to be fetched from Creation. For every thing that is created is not immortal. Yea, rather whatever is created is of it self mortal. And that some things are mortal, others immortal, proceeds not from the condition of Nature, but from the most free good pleasure of God; who created what he pleased, when he pleased, and how he pleased. And such is the Nature of Man, as God would have it to be; and it is so propagated, retaining its Essence given by God, even as he pleased.

The humane soul is present at the beginning of the Conception.

But let every man hold here as he pleases, and let him beleeve that the soul is infused or propagated: yet this (in the second place) I conceive to be most certain, That the Soul is present immediately upon the first Conception as soon as the seed of the Man and Woman are joyned and retained in the Mothers Womb, and the body begins to be shaped; and he that holds the contrary, whether he stand for the Propagation, or for the Infusion of the Soul, he is in an Error. For there are in the first place some of them who hold that the Rational Soul is not immediately created and infused by God, but propagated from the Parents, who notwithstanding slip back into that vulgar Opinion of the School-men concerning the Eduction of Forms, and hold, That the Soul does not at first lie hid in the Seed actually, but only potentially, and when the seed is somwhat wrought, and the members of the body are in some measure delineated, that then at last by the formative faculty inherent in the seed the Soul is educed out of the power of the matter excited and kindled, so that whereas before it only lay hid potentially, now it begins actually to be, to live, and to inform its body.

The humane soul is not educed out of the power of the matter.

But all which hath been formerly alleadged, Chap. 4. and 5. against the Eduction of Forms out of the power of matter and the formative Principle in the seed do make also against this Opinion, which it is needless to repeat in this place; only I think fit to produce here what is alleadged by *Balthazar Meisnerus*, in *Philosoph. sobr. part.* 1. *sect.* 3. *cap.* 6. *quæst.* 1. And to omit his other Theological Reasons which he brings, many Inconveniencies and absurdities follow from this Opinion. For in the first place an accident, viz. The formative power which is in the second rank of Qualities should produce so noble and excellent a substance, which is absurd. Secondly, the formative faculty should be without a subject. For the Prolifick Faculty is not a faculty of the seed, but of the soul. And therefore where there is no soul there can be no prolifick faculty unless we would have an accident to be without its subject. Again, this faculty in the seed is either corruptible, or not. If you say it is not, then the seed being corrupted either it passes into the soul newly produced, or else to some other place. But neither of these can be. Not the former, because the powers inherent in the soul are produced thereby, but do not produce it. How absurd were it therefore to say that the formative faculty does first raise the Soul out of the seed, and afterwards insinuate it self thereinto, and flow therefrom? Not the latter, because either it would go away by it self, or pass into another subject. The former is contrary to the Nature of accidents which do not subsist separated: and the latter is improbable, because no subject can be named to which it mixes it self. Therefore that Formative Faculty must needs be corruptible; which being granted, it follows that the Soul it self is corruptible and mortal: for an incorruptible thing cannot be generated out of a corruptible.

But those who hold the Creation and Infusion of the Soul do al of them conceive that the Soul is not infused at the first Conception, but when the body is formed.

But they who setting aside Authority and anticipated Opinions are willing diligently to weigh and consider the matter it self, cannot otherwise hold than that the soul of man is present immediately after the first Conception, and as soon as a Mans body begins to be formed. And for the proof thereof I wil use the same Argument which formerly I used in general to prove the presence of the Soul in the Seed. viz. Where ever the operations of the Humane Soul are, there that must of necessity be present. But at the first Conception the operations

The soul of a Man is present at the first Conception.

of

of the Humane Soul are forthwith present: *ergo* the Humane Soul is there also. Now these Operations are first the formation of the membranes which infold the Child, and afterward the shaping of the Child it self, which (as afterwards shal be said) begins at the first Conception. Afterward the augmentation of the Child it self. For sure it is, as soon as the parts of the Child are delineated they begin to grow. But in growing the Soul is communicated to the parts which are added to the Body. Therefore also in the first augmentation the parts which accrew must needs be animated. And absurd it were that the child being born should be augmented by one Soul, and in the Womb by another.

The opinion of Thomas Fienus concerning the presence of the soul in a child in the womb.

The most renowned *Thomas Fienus*, Professor of Physick in the University of *Lovaine*, was moved (*de form. fœt. quæst.* 8. *Conclus.* 11.) by the force (doubtless) of this Argument to dissent from al those who hold the soul to be infused, and that not til about the fortieth day after Conception, and to hold that the Rational Soul is infused the third day after the Conception of the Seed: which he proves by these Arguments. First, That which shapes the child shapes the membranes; but that which shapes the membranes ought to be the third day in the Seed. Therefore the Rational Soul ought to be about the third day in the Seed. For that which shapes the membranes ought to be in the seed before they be shaped, or at the same time when they begin to be shaped; since every Efficient Cause is in time before, or together with the Effect. But the membranes are shaped at the furthest on the fift or sixt day. Therefore they begin to be shaped on the third day at least; and therefore the Rational Soul ought to be in the seed at least on the third day. For two or three daies at least seem requisite to perfect the same; since they have a structure artificial enough, and little Veins and Arteries running through their substance which cannot be formed in a moment of time.

The Coats of the child in the womb are formed by the soul

Now that what forms the Child does also form the membranes, he thus proves: Beings are not rashly and without necessity to be multiplied. Now one and the same soul can perform al the Conformation which is requisite to the seed. For al parts are begun at one and the same time though al do not so in appear perfect. And therefore more than one Soul to shape is needless. Nor can any other soul or vertue be assigned which might form these membranes save the Rational Soul in the seed, which in *quæst.* 8. he proves at large. Yea, and he further shews that it is the Office of the same formative faculty which makes the child to make the membranes also. For in the first place the membranes are shaped for the childs sake, and the Seed is covered with them lest it should be defiled by the filth of the Womb, and the Menstrual blood, lest the seed should run about and slip out of the Womb, and that the spirits therein might not exhale. Secondly, the Membranes are formed of the same matter that the child is formed of, viz. of the seed, and consequently of the same formative Faculty. Thirdly, the membranes live, *ergo* are formed by the same soul wherewith they live. Fourthly, the Navel Vessels are formed by the same cause the child is formed by; *ergo* the membranes also. For the Membranes ought fitly to be joyned to the Navel Vessels, and the Navel Vessels ought to be cloathed by them, and to perforate and go through them. But that union and connexion cannot be made by different formative faculties. And ridiculous it were to think that the membranes are not made by any formative faculty, but are only bred by the heat of the womb as the crust of a Loaf by the Ovens heat, and the skin upon milk by the heat of the fire. For the generation of the membranes and their conjunction and connexion with the Navel Vessels is far more artificial than that it can be caused only by the drying of the fire; nor is it made by necessity of the matter, but it is specialcially intended by Nature, as without which there could be no Child made of the Seed.

The membranes are made presently upon the beginning of the conception.

Now that the Membranes are made the fift or sixt day, Experience it self, and the observation of Physitians does witness; as appears from *Hippocrates*, *Lib. de Natura pueri*, where he speaks of the dancing Wench who cast a Conception out of her Womb the sixt day after it was conceived being covered with a Membrane; *Galen*, 1. *de sem. cap.* 4. where he writes that frequently three or four daies after Conception the seed it self comes away covered with a Coat: And *Macrobius*, in *som. Scipionis*, *Lib.* 1. *cap.* 6. and al observations of later Physitians confirm the same. Secondly, he proves the same hereby, because towards the Introduction of the Soul (he speaks according to his own supposition, or else he would have said propagation) there needs no other action then that seeds should be mixed in the womb by the vertue and heat thereof, and be there fermented and actuated. And to such a mixture fermentation and actuation there needs no long delay of time. For Nature (truly) is not idle a moment, but begins to work as soon as the seed is conceived. And when the last dispositions (he speaks again according to his own Hypothesis) are induced to the Introduction of

the Soul, there is no further need of any other great alteration or elaboration thereof in the Womb. Which he proves by the example of the Seeds of Plants upon which the ultimate dispositions are so imprinted that often of their own accord they begin to sprout on the boarded floors where they lie.

The Authors judgment concerning the Opinion of Fienus.

Touching which Opinion of that most learned Man that I may give my sence; he writ most diligently and accurately above al others touching this matter; and setting aside Authorities, he freely and ingenuously propounded his own Opinion, and confirmed it with reasons, and for the most part held the truth. For in the first Conclusion he rightly proves, That neither God, nor Intelligences, nor the Soul of the World, were the efficient Causes of Conformation; in the second, That the formative faculty is not in the Womb; in the third, That the conformative faculty is in the Seed, and that it is intrinsecal thereunto; in the fourth, That the Native heat is not the principal efficient cause of Conformation; in the fift, That the Generative Faculty of the Parents is not the efficient cause of the conformation or changing of the seed in the Womb; in the ninth, That the Rational Soul is the first and only Soul in the Seed, and that no other does precede the same; in the tenth, That the Rational Soul in Man does shape its own body, and give the same its form; in the eleventh, That the Rational Soul is present about the third day after Conception. And thus from the formation of the Child he perceived evidently and cleerly, that the whol formation thereof was begun, continued, and perfectly accomplished by one and the same soul about the third day, yea, in the end of the second, or rather (since Nature is not a moment idle) as soon as ever the seeds are mixed in the Womb. Which is a thing so manifest that al who hold the contrary must needs fal into most absurd Opinions.

Wherein Fienus comes short.

But since even before the third day (as we shal shew anon) certain operations and some formation is made, he does not shew what causes that formation, either in Man, or in Bruits. Moreover, his Arguments do only prove, That the Rational Soul of a man is present soon after the beginning of Formation: but they do not prove, That the Soul of a Man is about the third day infused, or rather (as he phrazes it) increated by God. For although it be sufficiently demonstrated, That the Rational Soul of a Man is present at the beginning of the shaping of the child; yet another Question does now arise, viz. Whether it be propagated? or whether it be infused by God, and by him created in the seed disposed for it. Where he brings no Arguments nor Reasons for his Opinion, and his other Propositions wherein he differs from my Opinion, viz. The sixt, That the Soul of the Seed is not the efficient Cause of Conformation; the seventh, That in the Seed as it is Seed, and as it is in the Stones, and before it hath received the Soul in the Womb, there is no active vertue of Conformation or Generation; and that the Seed is not an Instrument in Generation, or an efficient, but only a material Cause; and that in neither of the Parents seed there is any active principle of generation, but only passive; the Eighth, That the Efficient of Conformation is the soul which comes into the seed after Conception: al these I say spring from that Hypothesis, viz. That the Rational is infused by God: had it not been for which he would doubtless have acknowledged the presence of the Soul in the Seed. Which Hypothesis nevertheless is built upon Authorities and no sound Reason, as shal hereafter appear; nor do the Patrons thereof bring any substantial proof for it, but only fly to that of *Justus Lipsius*, who when (*Lib. 3. Physiolog. Stoic. cap. 7.*) he had produced the Authority of *Tertullian* and many Latines, who held that the Soul was bred in the seed, and did not enter into the same, and had praised *Gregory Nyssen*, who said none in his wits could think that the original of the Soul was later than the Constitution of the Body, he concludes: *That it was an Opinion which might be maintained, had not the Church the purer sort of Divines agreed to beleeve otherwise: and therefore we must obey.*

Fienus his alse Conclusion.

And that which moved *Lipsius* to deny the propagation of the Humane soul by the seed, and rather to hold that it was infused, that doubtless hath moved others also, and amongst them the renowned *Marcus Marci*, who if he would have contended only with Physical Reasons, questionless he would have granted the propagation of the Hymane Soul by seed. Which appears in that, in *Lib. 1. Ideæ Idearum operatric. cap. 4.* he writes: And if any one would bring a reason of this diversity (viz. That the souls of Bruits are propagated with the seed, and not of Men) I refer that man to the Omnipotency of the Creator, who gives to al things not only such a faculty as is agreeable to their nature, but also their manner, time, number, order, and certain limits. But the Question is not here what God can do, yea, and what he hath done. But it is only pre-supposed and not proved, that God wil not have the Soul of Man propagated by seed; nor if that were held, does it import any absurdity; which does even by that appear which he afterwards adds. But nothing hindred if the Creator had so

so thought fit, but that the Soul of Man might have been so fastened to the seed that it also might be frequently multiplied and born again as it were in particular persons. But the reasons formerly produced do prove, That it so pleased the Creator, nor are there any sufficient reasons to prove, that God would not have it so. *Marcus Marci* endeavors indeed to prove that, when he adds: Yet because it was inconvenient that a Man should be so born, and disagreeable to the end for which he was created, the omnipotent goodness would not have it so. For the souls of Bruits tend only to adorn this world, and because through their corruptible Nature they cannot hold out in one Individual they diffuse themselves into many, that one succeeding another, that variety may be preserved. But the soul of Man does not only adorn this temporary Scene of the World, but is co-heir with the blessed Spirits of the Eternal World to come. Whence of necessity (the act of this life being finished) it is transferred into that same eternal Life which wil make it either happy or miserable. And in case there were but one soul in al, the same at the resurrection of the body should be happy and miserable, beloved and hated of God. But I conceive these reasons are not of sufficient weight. Nor does the propagation of the humane Soul by the Seed make it incapable of another life, nor does it thence follow that there should be one soul of al either now or hereafter. For he himself grants that the Creator could have caused the humane soul to be multiplied in the Individuals. But the holy Scriptures shew that God not only could, but would have it so, when they teach that God commanded that not only other Animals but Man also should beget his like, and multiply himself into Individuals; and the actions themselves which appear in the seed, and other reasons fore-alleadged do prove that several Individual persons have their several Souls, which being immortal shal neither be abolished after death, nor shal grow into one, but each at the last day shal be restored to its Body.

The shaping of a living body common to all living things.

And if (as I hinted before) *Fienus* and other learned men who have written of the formation of the yong one had sought the cause of the formation of a living body, not in Man as being too narrow a subject, but in general in al living things, Plants, and Animals, they had more easily found out the truth. For when (Quest. 5.) *Fienus* was necessitated to grant that the seed of Plants is animated he ought in the next place to have enquired how it is with the seed of Bruits whether it is animated or not, and what therein is the cause of the Conformation of an animate body. And since he himself grants that Conformation begins presently after Conception is made (and he solidly proves there is no other cause of Conformation but the soul, and the soul of Bruits is not infused from Heaven) he might thence have easily collected both that the seed of Bruits is animated, and that the soul therein is the Cause of the Conformation of the body. But seeing those things which he objects against the presence of the Humane Soul in the Seed do also oppose that of the seed of Bruits, he ought to have considered how they should be answered. For if he had done this he would easily have seen how those doubts which are objected against the presence of the Humane Soul in the seed might have been answered. One thing only had remained for him to enquire into, viz. Whether in the point of propagation the Humane Soul hath any thing peculiar to it self, which the bruit Animals have not: and since the formation of the members (which himself makes an argument of the presence of the Soul) begins not on the third day, but at the first moment of Conception, he ought to have proved why that formation should not be a sign of the souls presence.

Fienus does not prove that the Soul is not in the Seed before the third day.

Moreover, neither do the Arguments of *Fienus* prove this, that the soul is not present in the seed before the third day. For seeing as he grants, Nature is not idle a moment, but begins to work as soon as the seed is conceived and the operations begin to be performed in the seed after the first moment of Conception immediately, and as *Galen* hath it 1. *de sem. cap.* 4. three or four daies after the Conception the seed is already inclosed in a Membrane, and the Membranes (as *Fienus* proves) are formed by the same soul: it is truly necessarily concluded, that the soul was present before the third day, and had begun the work of her formation of the humane body. The observations of Abortions do conclude the same. *Hippocrates de nat. Pueri*, writes that he saw a Conception retained six daies in the Womb, and then came away, which was thus qualified, as if a man should take off the outward hard shel from a raw Egg, so that the humor contained within might be discerned through the thin skin. After this manner was that liquor disposed, and it was morever red and round. Also there were seen white & thin fibres contained in the Membrane, with a red thick bloody water, and the Membrane it self on the outside was died with blood resembling the colour of such as have stained faces. In the midst whereof there was a certain smal extant which seemed to me to be the Navil, and that it first breathed therethrough, and from thence was drawn a Membrane which

which imbraced the whol seed. And the same *Hippocrates* in his Book *de Carnibus*, saies tha he Conception hath upon the seventh day all that it becomes the Body to have; and that an Abortion made at this time being put into water does shew to him that shal diligently view all things the rudiments of all the parts of the Body. In like manner *Felix Platerus* writes in *Quæst. med. quæst.* 1. that for many years he had seen many abortions which in the first week were just after that manner: First of all (saies he) that same procreative faculty which lay hid in the seed does rouse it self and disposes those more remarkable portions of the seed which flowed from the three Principal parts of the Parents into three Bladders as it were, swelling with spirits, which are Rudiments of the Brain, Heart, and Liver, shut up in a smal body: and the other portions adhering thereunto it rudely separates into Limbs and Members growing thereto, which are commonly perfected in the first week, so that the Embryon being at that time cast out by abortion, such a shapeless smal lump made up as it were of congealed seed, round and rould together, appears distinguished with the three Bubbles aforesaid. Such as *Hippocrates* observed to come from that same dancing Wench, who caused abortion by her violent Dancing. And I my self saw such a kind of an Abortion like a round white Ball of the bigness of an Hazel Nut, which came from a certain Woman who every year almost did suffer Abortion not many daies after she had conceived: and I took it out of the thin coat *Amnios* wherein it did float, and when I pulled it asunder, I observed three such like Bubbles, the lower of which expressing a rudiment of the Liver was somwhat pale, but not red, also four portions to frame the Arms and Legs, and (which was pleasant to behold) I saw two very little black points marked out for Eyes; which as in others, so I observed the same in a certain Gentlewoman who for two whol years together (which was wonderful and not heard of before) did miscarry every month, and often sent me such an Abortion that I might judg what it was, and I alwaies found them after the same manner.

That the shaping of the Child does begin presently after the first moment of Conception.

Which things being so, it easily appears that the Conformation of the Child does begin at the first moment of Conception. Whence *Macrobius* in his 1. Book *in somn. Scipionis cap.* 6. writes: *that Seed which after it is cast into the Womb does not come back again in the space of seven hours is held to be a due Conception.* And a little after: *that Conception which any Woman holds beyond seven hours is created for life.* And *Ludovicus Mercatus Lib.* 3. *de morb. Mulier. cap.* 6. writes; when the seeds abide in the Womb, and seven hours after are not cast forth, if they be conserved and regulated by the heat of the Womb, it is to be believed that a Woman hath conceived. Hence *Hippocrates* tels us, that the beginning of Conception is to reckoned from that day in which the seed was retained and not from the seventh day, when in his Book *de genitura* he saies, If a Woman be acquainted with Child-bearing, and marks when the Seed does not come away, but abide in her Womb, she may know on what day she conceived.

Conception when it begins.

The Opinions of the Fathers concerning the formation of the Child.

With which reasons *Tertullian* (*Lib. de Anima*) and with him many of the Latin Fathers being moved held, *that a man is sowed or planted in himself or by himself, and that the Seed is alive from the very beginning.* And among the Greek Fathers *Gregory Nyssen, de anima & resurrectione* writes; *no man that is wel in his wits wil imagine that the original of souls is later and newer than that of bodies; since manifest it is, that no inanimate thing hath in it self a power to move it self, and also to grow. But of yong ones conceived in the Womb there is no question made of their growing and encreasing; nor of their motion from Place to Place. It remains therefore for us to hold, that the beginning of the Constitution of the Soul and Body is one and the same. And even as the Earth if it receive a Branch pluckt from the Root, it makes thereof a Tree not contributing thereto the faculty of growing, but only the matter of the growth: so we say, that also which is pluckt from a Man (the Seed) to sow a Man, it also is after a sort an* Animal, *and of an animate thing an animate thing.* And moreover he saies, that all the faculties of the Soul are in the Seed, yet they lie hidden; which in time and order rouze themselves up, and set themselves on work.

Chap. 11. *Whether Like may be said to ingender its like if the Soul be not communicated with the Seed?*

And thus we have proved that it is most agreeable to truth, that the Soul is propagated with the Seed: Secondly it hath been shewed, that the Soul whether it be propagated or infused is present at the first Conception, and is the Builder of its own House. And they that hold the contrary, do two things principally: First, they oppose the reasons brought

brought to prove the traduction of the Soul from Father to Son, and the propagation thereof by the Seed. Secondly, they endeavor to bring reasons to prove the Contrary.

Whether, unless a man communicate the Soul in his Seed he can be said to beget his like.

For in the first place, whereas it hath been said, unless the Parent communicate the soul to his Child in the Seed, like should not generate his like, nor should a Man Generate a Man, but an irrational Creature: many have several waies endeavored to answer this Argument but in vain. For in the first place, whereas some say, a Man may be said to beget his like, if he communicate the immediate matter fitted to receive the Soul; that is of no moment. For Matter does not suffice to constitute his like. And he which does not give the form of a Man, he does not beget a Man. For a Man without his form (which is his Soul) is no Man. And therefore if the Parents do not give the form of a man, they do not beget a man. Yea, and if the Father do not confer the Soul, the Child should neither have Body nor Soul from the Parent according to this Opinion. For *Aristotle* 1. *de gener. animal. cap.* 2. 20 & 21. and 4. *de gener. animal. cap.* 4. denies that the Seed of the Father contributes any part of the matter to the Body of the Child. Which although Physitians deny: yet this is certain, if from the Seed any part of the Body proceeds, that is very little and only the first lineaments of the Body; and *Aristotle* writes that the Body is formed of the Mothers Blood, and that the Father does rather confer the Soul, 1. *de Generat. anim. cap.* 20. *The Male yields the form and the Principle of Motion, but the Female the Body and Matter.* And what we said before in general of the Original of souls, the same must be here repeated, viz. If we hold that the soul is infused into the Body after it is shaped, it follows that they that are dead do generate. For since Generation is the union of the Soul with the Body, and according to their Opinion who hold that the Soul being created is infused by God, it may be infused upon the fortieth day or later, and in the mean while the Father may die: either the Father cannot be said to have begot that Child, or he must be said to have begot it after he was dead.

The Birth does not confer the likeness of Sort, but the Generation.

Again, Some conceit that a Man begets his like in respect of the species or sort, inasmuch as the end of Generation is the perfect nature of Man, and inasmuch as he is not born nor comes into the Light according to the order appointed by God, save with a body and a rational Soul. But this Answer suffices not. For if the rational Soul comes from without, the vital conception is not perfected into a Man, but there is nothing ingendred save an Irrational Animal. Nor is the Question concerning the birth of a Man, but his Generation; which is not performed in the birth, but in the due Conjunction of a Man and Woman according to the Ordination of God. Nor does a man only come into the world, but a Man is also conceived, as it is said of *Cain, Genes.* 4. ver. 1. Adam *knew his Wife and she conceived and bare* Cain. Nor is their objection more strong but the same with this, who say, that if that which is generated by a man is in its time perfected into a man, a man begets his like. For if he hath not his Form and Rationality from his Parents, but from some other, Like is not ingendred by its like.

The Souls of Bruits are not drawn out of the power of the Matter.

The nobility of mans Soul may stand with the propagation thereof.

Thirdly, Whereas some say that Axiom [Every Animal when it generates gives both the Body and Soul to its Issue] is to be understood only of those souls which are drawn out of the power of the Matter, but the rational soul is not drawn out of the Matter, nor depends upon the Body, as to its Essence; that also is of no great moment. For it is falsly and without all Reason presupposed, that the souls of Bruits are drawn out of the Power of the Matter, and depend upon the matter as to their Essence; seeing by Virtue of the divine benediction they are propagated by the Parents to their yong ones. Nor does the nobility of our understanding both in respect of its Essence and Operations shew any other. For so it pleased the Creator to associate a most noble substance to the Body. And therefore if a rational immortal soul can long abide in a mortal Body, Why may it not also be propagated with the Seed? Which if we affirm no absurdity wil follow, as we shall shew hereafter.

Fiftly, Some say, a man does so far beget his like, inasmuch as he generates a sensitive Soul, yea and the inclinations of his Parents to Virtues and Vices, and which is more, Original sin also (they say) is transfuted by means of this sensitive soul from the Parents into the Children. But this is only said and not proved, that there is in Man a sensitive Soul existing of it self besides the rational: And if there were, yet a man by communicating the same should not ingender his like. For the Essence of a man is not compleated by a sensitive soul but by a rational. But whether Original sin in our first Parents did stick only in the sensitive soul, and not in the rational also, I leave to the judgment of Divines.

CHAP.

Chap. 12. *Whether God, or some Formative Faculty does shape the Body of Man.*

Whether God be the Cause of the formation of Mans Body.

MOreover, since that which prevails most against those who deny the soul to be in the seed is the Formation of the body of Man, and yet they wil not be content to submit to the Truth, several men seek several excuses. For since none can deny that same admirable structure of our bodies, they severally invent several Causes to which to attribute the same rather than to the soul immediately present in the Seed. And here some fly in the first place to God the first Cause of al things. So *Alphonsus Caranza* a Spanish Lawyer, *tract. de part. natur. & legit. cap.* 1. when he had rejected al the Causes which others produce, at length he determines the first Cause of the Formation of Man to be God, and the Divine Power and Wisdom, and for his Opinion he brings that in *Psalm* 118. verse 73. *Thy Hands have made and fashioned me.* And that of *Job*, chap. 10. *Thy Hands have fashioned me. Hast thou not poured me forth like Milk, and curdled me as Cheese? Thou hast cloathed me with skin and flesh, and covered me with Bones and Sinews.* But in very truth the Wisdom and Power of God is sufficiently seen in the shaping of our Bodies: but that is not therefore to be accounted the immediate and sole Cause of our Conformation. For the same power and wisdom is seen in the Formation of Animals, yea, and of Plants too. And concerning the Lillies of the Field our Savior saies *Matthew* 6. 30. That God hath cloathed them. As therefore it must not be thence concluded, that God only is the Cause of the Formation of Plants and Animals; so neither may we conclude that he is the immediate Cause of the Body of Man. For God is not the Physical Cause, but the first and universal Cause, not by Natural Motion, but after an eminent and unexpressible manner, as by his presence he conserves al things, cherishes them, and governs them in their actions. Who though at first he created the World and al that is therein; yet he appointed Nature which is the ordinary power of God, according to the Rules whereof the Generation of things is now perfected. That Wisdom (truly) and infinite Power is primarily in the Creator; yet hath he given Power to Second Causes to perform artificial Works, which they also themselves do really accomplish (as was shewed before in chap. 2.) And therefore though it cannot be denied that God concurs in this work as the first and universal Cause (of which Concurrency of God as the first Cause with the second I spake in the foresaid Chapter) yet that he is not the proper Cause does hereby appear, in that Errors do sometimes happen in the Conformation of living Bodies; which would not be if God were the immediate Cause of Conformation. For he never errs in his Actings. Nor could Natural Causes be rendred of those Errors, which nevertheless Physitians do render either from the fault of the Matter, or inconveniency of the Place, or Imagination of the Mother. But the Actions of God cannot be corrupted or marred either through fault of the Matter, or Inconveniency of the Place, or Imagination of the Mother.

Whether a Formative Principle be the Cause of shaping the Child in the womb.

Others seek the Cause in the Seed it self; amongst whom some hold there is a Formative Principle which shapes the Child, and that the Parents use the seed as an Instrument in producing their yong ones. But this Opinion hath been sufficiently examined before, and refuted, unless by the Formative Principle they understand the Soul it self. And to ad this one thing more, a certain late Writer conceits he may avoid al difficulties, if he holds that the Formative Power does not immediately follow the Essence of the Soul, but that by the Divine Benediction it was given to the soul to raise up in the seed a Formative Faculty, which the Seed afterwards being shut up in its place does faithfully retain; and that this faculty does produce a substance, not by its proper vertue, but by that vertue it hath received from the Rational Soul; and that this Faculty when its work is finished does remain joyned to the Soul til the yong one be grown up, and then it puts it self forth again, and infuses into the seed a formative vertue like it self.

Whether any formative faculty can be in the seed without the soul.

But that which is wont commonly to fal out [that they who hold a false Opinion while they strive to shun one absurdity they fal into many] the same hath happened here. For in the first place, whereas every accident requires its subject, and is in the subject by its form: I demand, By what form (if the seed is not animated) this faculty can be in the seed. Which since there can be none assigned there would be an accident without a substance and subject. Secondly, since proprieties are only in one and their own subject, this Formative power should

ſhould firſt be in the ſeed as one ſubject, and after it ſhould be joyned to the Soul as another ſubject. Thirdly, Whereas the Formative Faculty (as by the augmentation of the body, and the regeneration of parts loſt, and chiefly in Plants and Animals does appear) is a proper power of the Soul, it can be no where ſave where the Soul is, and where it is we may firmly and demonſtratively conclude that there the Soul is. Fourthly, it is ſaid but not proved, that an accident by a vertue communicated may produce a ſubſtance. For no accident can ſo much as act, much leſs produce a ſubſtance unleſs it be directed by the Form from whence it flows, and from which it hath its power of acting, as hath been ſufficiently declared before in Chap. 5. concerning the ſeparate Inſtrument. But which way ſoever they explain this formative faculty, unleſs they hold the ſoul to be in the ſeed, they involve themſelves into inexplicable difficulties. For if they hold it to be a ſubſtance they multiply Entities in vain. And ſince al things belong thereto which are proper to the Soul, why ſhould it not be the Soul? But if it be an accident it can have no ſubject, and it wil act beyond its abilities.

Chap. 13. *Whether there are more Souls in a Man than one?*

Whether there are divers ſouls in a Man?

BUt others when they cannot deny the preſence of the Soul in the Seed, and are forced to confeſs that the body of the Child is thereby ſhaped, and yet wil not grant that the Rational Soul is preſent at the firſt Conception, they fancy divers Souls to be in a Man, not building upon ſolid reaſons, but chiefly induced by the Authority of *Ariſtotle*, whom in 2. *de gener. animal. cap.* 3. teaches, That a man firſt lives with a Vegetative Soul, then with a Senſitive, and at laſt receives a Rational Soul. The words of *Ariſtotle* may be ſeen in the place alleadged. But what the ſence of thoſe words of *Ariſtotle* ſhould be, is as great a queſtion as any amongſt the Expoſitors.

For in the firſt place, Some hold that every Soul is a ſimple ſubſtance, and that therfore there does not firſt come a Vegetative, then a Senſitive, and laſtly a Rational Soul; but that one and the ſame Soul in the Conception does firſt perform the Operations of growing, then of feeling and moving, and laſtly of reaſoning. For ſince the Soul cannot exerciſe its Faculties unleſs it be furniſhed with fitting Inſtruments, and does firſt perform the moſt neceſſary actions, and to Nutrition few Inſtruments are required, and that is in the firſt place moſt neceſſary, therefore that is begun in the firſt place to be practiſed; but ſince Senſe and Reaſon does require many Inſtruments, they teach that the operations thereof are exerciſed in proceſs of time, when the Organs of the Body are more perfect.

Others on the contrary do reject this Interpretation, and ſay that it is not agreeing to the words of *Ariſtotle*, while in the place alleadged he expreſly writes that the Vegetative Soul is firſt had in the Conception; and that the Senſitive Soul whereby he is an Animal is received after that, as alſo the Rational by which he is a Man, and that this only comes from without.

Since therefore the Expoſitors themſelves of *Ariſtotle* are doubtful of his meaning, the ſureſt way is to ſet aſide Authority, as is altogether moſt fit in the ſearch of Truth, and to conſider the matter it ſelf, and mannage our buſineſs with reaſons only. Which doing we ſhal find that it is moſt ſuitable to truth to hold that there is only one Soul in Man, viz. The Rational Soul, yet furniſhed with the abilities of the inferior Souls, and beguifted with a Vegetative and Senſitive Faculty. And if the words of *Ariſtotle* admit this ſence, of which I diſpute not, it is a ſence convenient enough. For (which we are to note in the firſt place) the Soul is a ſimple Eſſence, and there is one only Soul in every living thing, but furniſhed with divers faculties. In every Plant there is a ſpecifick Soul; yet that hath ſundry Faculties, it nouriſhes, augments, ingenders Seed, and alſo performs the proper actions of its own kind; and the properties and actions of a Roſe are of one ſort, of Roſemary of another, of Rhubarb of another, of Hellebore of another, of the Eugh-tree of another. Every Animal is nouriſhed, augmented, begets its like, hath ſundry Senſes, is moved, and finally performs that which is proper to its kind; and a Bee hath one ſort of properties and actions, a Piſmire another, a Sheep another, a Crow another, an Elephant another, an Ape another: which are not indeed Rational, yet as the Underſtanding is the ſpecifical propriety of a Man; ſo thoſe alſo (beſides ſenſe and motion, which are actions common to al Animals) have ſomwhat ſpecifical. And if it be not abſurd in a Plant or Animal for divers Faculties and Actions to proceed from one Soul, why ſhould it be abſurd to hold the ſame in Man?

There is one ſoul in a Man.

Divers faculties and actions flow from one ſoul.

Reasons to prove that there is but one soul in a Man.

And that we should hold that there is but one Soul in every Animal from whence divers faculties and actions do proceed, and not divers souls, many reasons there are that perswade us. For in the first place, If there were divers souls in a man every man should not be one Animal, but should have divers operations from divers forms and acts. Whereof *Julius Cæsar Scaliger*, *Exercit.* 307. *Sect.* 5. hath treated largely. There is no reason (saies he) which can perswade me that our Soul (an immaterial substance, and a certain particle as it were of God) should be any waies compounded, especially of two things actually contrary. For I do not think Water is so contrary to Fire, as that which is Rational is to that which is Irrational. The Soul which is totally in every part of the Body, how can it have at once two parts actually contrary one to another? And a little after: For a Man should be so one as an heap of several things laid together, no true Man but a Geryon, and true Chymera or Monster. Nor can those who hold the contrary avoid the force of this Argument, by saying, That there is in Man only one first specifick form, and that the rest are generical and subordinate to the specifical, and that the rational soul in Man as the chief does only perform the office of a form; but the rest though of their own Nature they are forms, and are actually in the living Creature, yet being compared with the principal they are more like matter than acts. We may indeed grant that there may be divers forms in one Individual, of which only one is specifical, and the rest pertain to the disposition of the matter; yet all those forms as they belong to the matter are passively disposed, and the specifick form as the primary Agent uses them as its subject and primary Instrument; and they do not perform such actions as determine and constitute any Individual to be of such or such a sort. But the Vegetative and Sensitive Faculty (they call it Soul) do not pertain to the disposition of the matter, but are primary faculties; and according to their Opinion, the Sensitive performs the office of a specifick form, before the coming of the Rational. And therefore if before the coming of the sensitive soul the vegetative, and before the coming of the rational soul the sensitive should constitute the same Individual, one numerical Individuum should at divers times be informed with divers specifick forms; which is absurd: and so if an Individual should contain divers perfect beings in it self, it would be one by accident, and an heap of things.

There is no vegetative thing but pertains to some sort of vegetables.

Secondly, If a man should in process of time receive divers souls, this absurdity would follow, That there are divers living Individuals which should belong to no sort of live Creatures. For while a man lives only by the vegetative soul he must be a Plant, nor yet should he belong to any sort of Plants; while he lives with a sensitive soul he must be an Animal, but yet not belonging to any sort of Animals. To which reason although some endeavor to answer; yet they alleadg nothing that is of any moment. *Job. Gallego* allows the answer of *Toled.* 2. *de Anima, cap.* 3. who saies, That such an Individual is not essentially a Plant, and therefore is not under any kind or sort of Plants; but that it is contained under the kind of an *Embryo*, and under some sort of the same kind; and that Nature hath made two distinct sorts of Vegetations, the one of which is a Plant, and the other an Embryo or young Conception; and that this kind of Embryo's does contain under it so many sorts of Embryo's as there are of perfect Animals, and that the sort of Humane Embryo's hath a Nature by it self, which as the Instrument of the Generator makes an Organization convenient to receive the Humane soul created by God. But one absurdity being granted a thousand follow, and thus one absurdity is heaped upon another. For if this vegetative degree is common to Plants and Animals, how comes it to pass that from that vegetative soul which is in the Embryo an Horse is brought forth, and not a Rose, or a Dog? And since they make so many sorts of Embryo's as there are sorts of perfect Animals, it must needs be that one Embryo, if it be of a different sort from another, it must differ by some specifical form. But that is of no moment which the same *Gallego* saies, that the vegetative form of an Embryo produced by the Womb of a Woman does not make the Organization of a Plant, nor of another Animal, but rather that of a Man; both because it is directed by the soul of the Woman having the same Organization; and also because of it self it hath a natural Inclination to make such an Organization. For in the first place, false it is, and not yet proved, That the soul of the woman directs that Organization, as was shewed before. Moreover, whence hath it that inclination to such an Organization? Certainly it cannot have it from the common and generical form, but every determination is from the specifick form. And what will it be then when it comes beyond the degree of a vegetative, to the degree of a sensitive Embryo? For since it is then neither a man nor any other Animal (for the sensitive faculty constitutes no particular sort of Animal) what I pray you must it be, since it is constituted in no sort of Animals as wanting a specifick form? Therefore it must needs

come

come to this, That the Soul which is in a perfect Child is also in the Embryo, and that which finishes the work is the same which began it: viz. That the Soul of a Lyon forms it self a convenient body, the Soul of an Horse forms a body fit for it self; and that in the Embryo of a Lyon there is no form distinct from other Animals but the Soul of a Lyon; and that the form of an Embryo (as it is described by *Tolet* and *Gallego*) is a meer figment.

And except this be granted, a reason of the formation of an Humane Conception, of its nutrition and augmentation, and of al the operations performed therein cannot be rendred. For the formation of the child in the Womb, and of al its parts and Organs, as also its nutrition and growth, are quite different from other Animals. For no sort is constituted by divers forms, either at the same or a different time, but by one only, which thence also hath its name, and is called specifical. It does shape it self such a body as answers the Idea thereof in it self, and by such a body performs such actions as by which it is distinguished from other sorts. Hence a man from his own specifick form or soul hath such a body as no other Animal hath, and performs such actions as no other Animal does.

Thirdly, If first the Vegetative soul should inform the body, afterward the sensitive, at last the rational, a Man should be compounded of a Plant, a Bruit, and an Animal. And this absurdity would also follow, That if the sensitive and rational did flow from divers forms, it would be no essential axiom or declaration, when we say a man is an Animal or living thing; for the Nature of the Animal should not flow from the form of Man. But if from both souls the same Attribute should flow, a Man should not be one Animal, but two; viz. An irrational Animal in respect, or by vertue of his sensitive Soul, and a rational in respect of his rational soul.

Nor are the Objections made to the contrary of any weight. For in the first place they say, That many and divers beings cannot proceed from the same Form, nor can the same being proceed from divers and distinct Forms since the Form is the adequate Cause of the Essence. And therefore since the same subject is a Man, an Animal, a living thing, he cannot have these divers beings from one form, but from divers. And contrariwise, Because Man, bruit Animals, and Plants, are living things, and that distinct in their forms, that which is common to al of them cannot proceed from the forms by which they differ, but from that form which is equally in them al. But we deny that the vegetative, sensitive, and rational, are three distinct Beings proceeding from divers forms; but they are only the powers of one and the same soul. And that which hath deceived many is this, That they hold that in some body there may be the vegetative soul alone, in another the sensitive, and that by it an Individual may be constituted. For the Vegetative soul constitutes no Plant, or other sort of living thing, but nutrition and augmentation are common to al living things, and Plants differ specifically one from another as wel as Animals do, and there is one form and specifical soul of a Rose, another of Rosemary, another of an Oak, another of a Pear-tree, another of an Apple-tree; whence, though a Rose, and Rosemary, and an Oak, and a Pear-tree, and an Apple-tree are nourished and augmented; yet they are augmented after a different manner, and each draws a different Aliment, and produce leaves, flowers, fruits, after a different manner; some of them grow to a great height, others creep by the ground, or at least grow not very high. After the same manner sense and motion does constitute no Animal, but al sorts of Animals have their specifick forms or souls, by reason of which sense and motion are in al sorts of Animals different, and the external senses are in several sorts different, as also motion; some creep, others fly, others walk. Howbeit, besides sense and motion they perform actions proper to their kind; a Dog is quick-scented and faithful; an Horse is courageous, and after his fashion proud; an Elephant is discreet in its way; of which see *Justius Lipsius*, *Cent.* 1. *Epist.* 50. the Spider weaves its nets; the Bee makes Honey-combs, &c. For in al living things there is a nourishing, growing, and generating faculty; but these faculties and actions do constitute no sort of Plants; but in each Plant there appear yet other actions which flow from the specifical form as such, and by which Plants differ one from another. In al perfect Animals there is sense and motion, but sense and motion do constitute no particular sort of Animal; but besides sense and motion there are in every sort of Animal other powers and actions which proceed from the specifick soul as such, and whereby Animals differ one from another. Nor are the vegetative or sensitive, or the vegetative, sensitive, and rational, certain peculiar forms distinctly existing, and three Essences. For although they are really somwhat in Nature: yet they subsist not by themselves apart, nor are they any where, or at any time separately existing save in the mind, just as a Being, a substance, and a body; and therefore they do not multiply the Essence of a thing.

Whether a Man hath three Essences?

The Vegetative soul constitutes no Plant of it self.

Sense and motion do constitute no sort of Animals.

From one soul flow all the faculties of the same sort of Animal.

Secondly, They object, that if in a man there be not a vegetative and sensitive Soul, but only their faculties, then there will be a power of a power. But this does not follow, nor does the vegetative faculty flow from the sensitive, nor the sensitive from the rational, but all the three faculties flow immediatly from one soul, as from the same form of Fire Heat and Lightness do proceed.

Thirdly they say: Where there is the operation of any form there is the form it self; but in Man besides his understanding there are the operations proper to other souls, therefore there are in him other souls also. But the answer is the same we gave to the first argument. Nor are the vegetative or sensitive faculties, Powers which proceed from any peculiar and specifick form. A Rose, Violet, Willow, Oak, Dog, Lyon, Ox, are counted so many sorts of living things, but there is no where existent a vegetative faculty which does constitute any species by it self: but the vegetative and sensitive (as was said before) though they may be conceived and considered distinct in our minds, yet they do not any where or at any time exist distinct in nature. And what will they answer concerning Bruits, of which the same question may have place? For when an Horse is formed, that action pertains to the vegetative faculty, and is a work of the formative faculty; but that vegetative faculty, is no peculiar soul different from the sensitive and the specifick which Neighs (for by this mark the unknown specifick form of an Horse is commonly described) but these are faculties of the same soul, which in the first place forms the Organs of Nutrition, as being in the first place necessary, and afterwards the rest.

Fourthly, they object: Where there are operations differing in kind, there also are different forms; but in a Man there are operations differing in kind, Vegetation, Sensation, Intellection: *Ergo* also souls differing in kind. But different operations do only argue divers forms where the subjects are divers. But in one subject different operations may proceed from the same form.

How a Man is at once a Man, an Animal, A Vegetable.

Fiftly, they object: If the humane soul were a simple Nature not compounded of a rational Essence and of a sensitive and vegetative soul, by the same very soul a Man should be a Man, a Beast, a Plant; and seeing whatever belongs to a man that belongs to him of it self and primarily by virtue of his specifick form, a Man should be primarily and of himself, a Man, an Animal, a Vegetable. But a man can no waies be said to be primarily and of himself a vegetable, or sensitive Creature; both because vegetation is a proper passion of an animate body, which is the remote Genus of a man, common to every sublunary living thing, and Sensation is the property of an Animal common even to Bruit Beasts. And therefore the adjunct of a kind does not of it self primarily belong to a sort of that kind. But out of our Answer to the first Argument an Answer may easily be brought to this also. For that which they count absurd is not so, viz. that by the same soul a man should be a man, and an Animal, and a Vegetable; or to say better, should both understand, move, and grow. For neither is an Animal or Vegetable, any thing distinctly subsisting in nature; but as a man by one and the same soul is a Being, and a Substance: so is he also a Living, Sensitive, Moving. Mean while, because these Conceptions are different, some Generical, others Specifical, some most special, we may not attribute the adjuncts of a Being or Substance to the soul of Man as it is rational, and as he differs from all other animals.

Nothing corruptible in the soul of Man.

Sixtly, they say: Corruptible and Incorruptible differ in kind. But the rational soul is incorruptible, the rest corruptible. Therefore they cannot be in one subject. I grant the whol Argument. For neither is the soul of man compounded of a corruptible and incorruptible, either substance or faculty: but the sensitive and vegetative faculty in man are as incorruptible as the rational, since they flow from the same soul.

Seventhly, Whereas *Plato* and those who follow him, do therefore conceive they ought to hold divers souls in a man, because there is a certain fight betwixt the rational part of the soul and that part which is subject to passions; since nothing fights against it self: that by Christians is easily Refuted, who know, that that same fight betwixt the divers faculties of the soul is not Essential thereunto, but came in by the sin of our first Parents.

Let us therefore constantly retain the Opinion of most learned Men, which is guarded with strong reasons, and against which nothing solid can be alleadged; that the soul in every living thing is only one, but furnished with divers faculties which in every Plant performs the acts of Nutrition, Augmentation and Generation, but in each after a peculiar manner, and moreover performs that which is proper to every Plant; whence a Rose differs from an Oak and a Vine: and that in Animals there is somwhat which besides Nutrition, Motion and Sense, performs that which is proper to every Animal. For no Animal is perfected by sense

ſenſe and motion only; but as underſtanding is proper to a Man, ſo in every Animal (beſide the moving and ſenſitive faculty) there is a proper faculty, which anſwers to ratiocination in a man, and by which one Animal differs from another.

Why the ſoul preſently upon its Riſe does not propagate all its operations together.

Now the Soul does not perform all theſe operations together at the firſt Generation of an Animal, but thoſe in the firſt place which are moſt neceſſary, and therefore ſhe does in the firſt place finiſh the Organs of the ſaid moſt neceſſary actions. For not to ſpeak now of the Child in the Womb, but of the Infant when it is born; that it hath a perfect Soul is out of Queſtion; yet it does not preſently Go, it does not Speak, it does not Reaſon: but in proceſs of time it performs all theſe things; but it is preſently nouriſhed and augmented: but when the Organs neceſſary for thoſe other actions are finiſhed and perfected it performs all thoſe things. And hence alſo it happens, that although Generation pertains to the vegetative faculty yet it does not ſhew it ſelf before the twelfth or fourteenth year; although the operations of the ſenſitive and rational ſoul do ſooner exerciſe themſelves.

And ſuppoſe we ſhould grant that the rational ſoul hath ſomwhat peculiar: yet no cauſe can be aſſigned, why as in Plants (which cannot be denied) all actions proceed from one ſoul, they may not do ſo in all other living things, and why the ſpecifical ſoul of every Animal may not forthwith be preſent with all its faculties. Nor can they alleadg at leaſt one probable reaſon whereby to prove that in a Dog, or Lyon, at firſt there is only a vegetative ſoul, and that the ſenſitive and motive faculties do come afterwards. For as it does not follow, that the moving ſoul is not in a Whelp, becauſe it does not run as ſoon as it is born, or in a Chicken or Pigeon becauſe it does not fly: ſo alſo we cannot conclude that in the ſeed there is not preſent the ſenſitive and motive ſoul, becauſe thoſe actions are not performed by the Seed.

And verily thoſe who think otherwiſe do involve themſelves into many difficulties; and whiles they build, now upon Reaſon, now on Authorities and falſe ſuppoſitions, and endeavor to reconcile Truth and Fallehood, they involve themſelves in Labyrinths and Mazes inextricable.

For in the firſt place, *Aquinas* grants out of *Ariſtotle*, That firſt there is only the vegetative ſoul, and that afterward the ſenſitive comes, and then follows the rational. But he holds that the vegetative ſoul periſhes when the ſenſitive comes, and that the ſenſitive periſhes when the raional comes; and that becauſe (5. *Phyſ. text.* 38.) he finds written, that one numerical thing hath only one numerical Act, and that conſequently divers forms cannot be in one ſubject, and therefore he thought, when the later form comes the former muſt periſh.

Aquinas was in the right in judging that one thing hath but one form; and if he had held, that preſently upon the firſt original there is only one ſoul in every living thing, he might have eaſily acquitted himſelf. But while he endeavors to reconcile this true opinion with a falſe one, viz. that at different times different ſouls are produced and come into a man, he fals into abſurdities. For thus the Child in the Womb wil not remain the ſame in number, but wil be a different thing; being one kind of thing when in the firſt daies it is nouriſhed and augmented by the vegetative ſoul; afterwards another when it is governed by the ſenſitive ſoul; and again another when the rational ſoul comes into it. And if the ſoul or ſpecifick form of another Animal, after it comes, is ſufficient for Nutrition, Augmentation, Senſe, Motion, and to perform that which is proper and ſpecifical to every Animal, Why may not the ſame alſo in Man preſently upon the firſt Conception be the Cauſe of Nutrition? And what great need is there to multiply Beings, ſince one ſoul is ſufficient to perform all the actions which belong to every Animal?

The Child is ſhaped only by the Soul.

And the very ſhaping of our Body does ſufficiently ſhew the abſurdity of this Opinion; and that formation is begun and perfected only by one ſoul there are many things which prove. For in the firſt place (as was alſo ſaid before) there is no vegetative or ſenſitive ſoul ſimply exiſting, which is not determined to ſome certain ſpecies. In Plants indeed there is a vegetative ſoul, and in the Conceptions of Animals. But the Vegetative in Plants is ſo ordered by Nature that it draws nouriſhment out of the Earth and faſtens it to the Plant: contrariwiſe the vegetative of Animals draws it not out of the Earth, but in the Womb from the Mother, and after the Child is born out of its Veins. In like manner, the ſenſitive faculty is in a Dog, in an Ox, in a Man. But in an Ox it delights in Hay, not in a Dog, nor in a Man. Mean while, ſince according to theſe mens opinions there are the operations of a vegetative and ſenſitive ſoul in the Child in the Womb before the rational ſoul be preſent, there ſhould then be operations which ſhould proceed from no ſoul. For there could not be in the Child in the Womb the ſoul of any imaginable Plant, nor of any Animal that can be named.

As the vegetative is in Plants and Animals after a different manner, ſo is the ſenſitive in Animals.

Secondly,

Secondly, Since presently after Conception Conformation begins, that should be performed by the Vegetative Soul which is first present. But since that according to the Opinion of *Aquinas* it is soon extinguished, and its conformative faculty is withal abolished (for a faculty cannot pass out of one soul into another) and nevertheless Conformation is continued, it must needs be that the sensitive must finish the same, and when that also is abolished the rational. But it is absurd, that one numerical Conformation should be made by three powers of distinct sorts, or (as they say) specifically different, or the faculties of three souls specifically distinct. And how wil they explain the Conformation of Bruits in which (according to their Opinion) there is no such succession nor introduction of divers Souls? And therefore as in bruit Animals by the same faculty the yong one is nourished, the tenth day, the twentieth, the thirtieth, and al the months of Gestation, or while it is in the Mothers Womb, yea, and al the rest of its life; and al those acts of nutrition do make up one numerical nutrition continued from the beginning to the end of the Creatures life: so also no cause can be given, for which the Child also in a Womans Womb should not be nourished the tenth, twentieth, thirtieth day, al the months of its being in the womb, yea, and al its life time by one Soul.

Thirdly, If the soul which is first introduced is the cause of the Conformation of the parts for the introduction of the following soul it should act beyond its forces. For the vegetative soul hath not the ability to form parts necessary for the following soul being sensitive; nor hath the sensitive soul (I speak according to their imagination of three distinct souls) power to form parts necessary for the rational soul. 'Tis therefore better to hold with *Themistius* that each soul is the builder of her own house.

Secondly, *Alphonsus a Caranza* when he saw that he could not hold divers souls in one Man, he sought another starting-hole, and *de part. nat. et legit. cap. 1. parag. 2. de animatione*, holds a twofold Animation, answering to the double formation of a Man, the imperfect and the perfect; and he teaches, That in the first time of that ruder formation the child lives with the life of Plants, and in the second time with a perfect life, or with a sensitive and rational Soul at once. Now he teaches that by the life of a Plant we are to understand a certain vital and nutritive faculty, but not a true life which is not in Plants; since Philosophers in this manner of speaking do not understand a true life, nor do speak properly, but improperly and by way of similitude. Forasmuch as there is only one soul in man, and one life, and that there is no concourse of souls, following one after another in the same subject, but one soul which is infused after the utmost perfection of the body. And he writes, That *Aristotle* being moved by this reason wrote in 7. *Politic. c.* 16. That to avoid over-abundance of Children (according to the Gentiles Custom) it is lawful to endeavor Abortion, provided it be done presently after the Conception, when the Child lives the life of a Plant; but that after the coming of the rational Soul it is wickedness to do it.

Whether Plants do truly live?

But in good deed, these things are thus said without al reason, and do contain many falsities. For in the first place, it is false that the Plants do not truly live. For though others do otherwise define life, yet which way soever it be defined it properly belongs to Plants as their operations do testifie. And where there is life there is a Soul, and there is no life without a Soul. Since therefore he acknowledges vital Operations in that former and rude formation (and it cannot also indeed be denied) he must needs acknowledg the soul to have been long since present; or let him shew us that subject to which those faculties belong which perform those Operations of nourishing, augmenting, and forming. And therefore secondly, if the rational Soul is not infused (as he holds) before the perfect Formation of the body, I desire him to shew us what it is which forms the body til the thirtieth or fortieth day.

CHAP.

CHAP. XIV.

The Contrary Objections Answered.

NOW that some should think the contrary, and neither allow of the Propagation of the Soul from the Parent to the Child, nor of the presence thereof in the Seed, they are moved with divers Reasons, and most do chiefly urge the prerogative of the Humane Soul; and use three Reasons drawn therefrom, which they fetch out of *Aristotle*, 2. *de generat. animal. cap.* 3. The first is; That cannot be without a body, the action of whose Principles is corporeal, for examples sake to walk without Feet: but the mind alone comes from without, because the corporeal action communicates nothing therewith. But let us indeed grant that the soul separated from the body does communicate no more with the body and bodily actions, and uses no bodily Organ: yet that the soul when it is in the body hath nothing to do with bodily actions, subsists by it self, and therefore is in the generation of a Man created, is false. For the Question is not now concerning the Soul, which hereafter (being separate from the body) shal persist by it self through the singular pleasure of God, as shal hereafter be said; but concerning the work of Generation our Question is, and concerning the Humane Soul as it shapes and informs the body. That this Soul in this life hath no communion with the body cannot be granted. Indeed if the Rational Soul in Man were a peculiar soul distinct from the vegetative and sensitive, this reason would have some probability. But since there is only one Soul in a Man, having a vegetative, sensitive, and rational Faculty, as was proved in the foregoing Chapter, and the Soul of a Man does not only understand and reason, but also informs the body (not of an Hart, or a Lyon, but a Man) nourishes it, augments it, conserves it, and makes it enjoy sense and motion, and that not after the manner of Bruits, but of Men; it is most manifest that it cannot want corporeal Instruments, and that when it informs the body, and performs these Organical actions, it communicates simply with the body. And although in respect of the rational Faculty some of its actions are inorganical, as when it understands the intelligible species without a species, and when it reflects upon it self, and knows that it understands that it is able to know it understands, also when it wills; and indeed the mind does not understand by the body as the means and Organ wherewith; yet because while it is in the body it needs a Phantasm for its object, and as *Aristotle* himself (3. *de Anima, text.* 39.) speaks, the Intellect needs to contemplate the Phantasms; and nothing is in the Understanding which was not in the Sense: certainly the Understanding must needs communicate with the Phancy. Which is sufficiently declared by sundry sorts of mad men, in whom Ratiocination also it self is hurt, by reason of the society it hath with the disposition of the body and bodily Instruments; as also the variety of Wits, whiles some are excellent for sharpness of wit, and others are blockish, proceeds from the same cause. All which things being so, and though the Understanding do not use the body to understand withal: yet since it is necessary that it should speculate the Phantasms, there is no cause why we should so absolve the Understanding from communicating with the body as long as it is therein. Much less is there any cause why at last when the body is perfectly shaped it should come in from without.

Such things answered as are brought against the propagation of the Humane soul.

Whether the humane soul participate with bodily actions

But especially al that have followed this Opinion have been deceived by that false Hypothesis, touching the Eduction of Forms and Souls out of the power of the matter. For since they beleeved the souls of Bruits were drawn out of the power of the matter; they would not ascribe so ignoble an original to the Humane Soul, and therefore they argue; The Rational Soul is not drawn out of the power of the matter, *ergo* it is created. Or, Whatsoever is not made of a pre-supposed matter or subject, that is created; but the Rational soul is not made of another matter or subject, *ergo* it is created. That is the false Hypothesis (I say) which they build upon, That some souls are drawn out of the power of the matter. If (truly) those souls of bruit Animals and Plants did spring out of the power of the matter, it were not absurd to ascribe a more noble beginning to the Soul of Man; but since that Hypothesis is false, and no souls of any kind are (to speak properly) drawn out of the power of the matter; but souls were put into al living things, and received from the Divine Benediction a power to multiply and propagate themselves, nor are they made of the seed as of matter, but are propagated with and in the seed: if the same original be attributed

The souls of Bruits are not drawn out of the power of the matter.

tributed to the Humane Soul, no absurdity wil follow: it namely we shal hold, That being in the first Creation made by the most good and great God, and implanted in the body of Man, by vertue of that Command *Encrease and multiply* it hath received a faculty to propagate and multiply it self in and by the Seed. Nor is the Rational Soul an Essence compleat by it self, as the Angels are, which subsists alone by it self; but it is the one half of a Man which informs the Humane Body, and therefore as its society with the Body derogates nothing from its nobility and immortality, no more does the propagation thereof with the Seed.

whether if the Humane soul be propagated from the Father to the Son, it should be therfore mortal.

Secondly, Many have been moved to hold that the Humane Soul comes from Heaven and from without into the body, because they conceit that if it were propagated with the seed, it must needs be mortal. And in good deed (to speak ingenuously) this is a very promising Argument, and by many variously urged and aggravated. For since the seed is sundry waies shed so that no Conception follows (as when a man spils it out of wantonness; in the Gonorrhea; when a man couples with a woman with child, or with a barren woman, and indeed many waies the seed is often so shed that no formation follows) they conceit it should come to pass that so often the soul of Man (which is otherwise counted immortal) should perish, and man-slaughter should be committed. And therefore by this Argument which they count invincible and unanswerable, being moved, many have held the infusion of souls; and seeing they did acknowledg it necessary that the formation of the child should begin presently after the first Conception, and yet they durst not attribute the same to the Rational Soul, some invented one, others another cause of formation, and attributed the same to a formative Faculty, or to the Womb, or absurdly to a certain sensitive soul present before the rational, the vanity whereof hath been shewed before. But the strength of this Argument is not so great as is imagined. For as *Scaliger* rightly teaches, *Exercitat.* 61. *Sect.* 5. and *Exercit.* 307. *Sect.* 20. God alone is truly immortal and incorruptible, because he only hath his being from himself, and depends on none; but in respect to God al created things are mortal and corruptible, which at the pleasure of the Creator may be deposed from that being wherein they are constituted. Yet some of them are not corrupted, as Angels and the rational Soul, because the Creator wil not have them corrupted, and hath made nothing contrary to them whereby they might be corrupted, nor hath so plunged them in matter as that they cannot subsist nor operate without the same: and so they are immortal not by Nature, but by Grace and special favor, as *Damascen* speaks, *de Orthodoxa fide, cap.* 3. And questionless (as was said in the answer to the foregoing argument) there is great difference betwixt Angels and Men. They have never had any thing to do with matter, nor shal have. But the Humane Soul (while it is in the body) does necessarily use corporeal organs, and therefore it is not propagated without matter. And therefore that is false which they say, if the Humane Soul exist after death by it self without matter, therefore it is also produced without and free from matter. For as it pleased God that the Humane Soul should not subsist without the body, but should naturally have its subsistence in an Humane body; so it is also his pleasure that it should be propagated in and with the seed. In a word: the manner of Generation makes nothing to the corruptibility or incorruptibility of an Essence, but that depends simply upon the will of the Creator who made al things of nothing when they did not exist, and by his power preserves them so long and after such manner as he pleases from sliding back into nothing again. Without which Divine pleasure and peculiar Grace to Man-kind, the forms of men should have perished as wel as those of Bruits. It is therefore no consequence, if the Humane Soul whose natural habitation by the will of the Creator is an humane body, being separated therefrom by death can subsist by the Divine pleasure, therefore of necessity it did subsist out of the body before it was associated thereto. And whereas they who assert the Creation and infusion of the soul do hold that God makes Humane Souls immediately without seed: it is impious to say that God could not also make them immortal by means of the seed. And to those other things that are brought to aggravate this argument, touching the effusion of seed without any conception following: I answer, That the Divine benediction, and those gifts of Grace which God by his free pleasure and ordination hath granted to the seed and soul of both Parents joyned together in Conception, must by no means be attributed to the seed of one Parent alone, not shed after such a manner as is necessary to Generation. Yea, and since neither in other Animals the seed of one Parent hath such perfection that one alone is sufficient to make a Conception, and those attributes which are rightly attributed to the seeds joyned may not be attributed to the seed of either by it self; that is much more true in Man.

But

Why God made Sexes in Animals.

But why God made Sexes in Animals must be ascribed to his divine Wisdom and Pleasure. God if he pleased could have created more Worlds, yet he created but one. For God does not alwaies that which is absolutely most perfect, or seems so to us, but that which is best in respect to the End by him aimed at. And therefore though God had created one man more perfect, and who might have had in him the perfection of both sexes, yet had not the World been thereby more perfect, whose perfection consists in the wonderful consent of al Essences, and in their coordination and conspiration to one End. For one sex being wanting, the life and Society of mankind would be less pleasant (which consists in Wedlock) and less firm. And therefore the most good and great God made a double sex that each might have what to love out of it self, and so not only represent the wisdom of God by knowing, but his goodness also by loving.

Whether the Seed be an Excrement.

Thirdly, they object that the seed is an excrement of the third digestion, and therfore not so noble as to be capable of the rational soul; but that only a perfect Body and furnished with al its Instruments is apt to receive the rational soul. Of this Argument we have spoken in the Chapter foregoing, and in Chap. 6. and 7. where I have demonstrated that the seed is not an Instrument properly so called, nor that any unprofitable thing is generated in the Body; yet in that sence it may be called an excrement inasmuch as it is voided forth of the Body. Otherwise and of its own nature it is the most noble substance of the whol Body, and an Epitomy (as it were) and fruit of the whol Man, as hath been said. Much less is it an excrement of the third concoction: but is bred of venous and arterial Blood, and vital spirits in their vessels, that it may be a fit receptacle to receive the soul. And there in all sorts of Animals it is capable of the soul. And if the rational soul may be received by a Body formed of the Seed and menstrual Blood, Why may it not also be received in the seed?

Besides these three Reasons, some do use divers general Arguments against the presence of the soul in the seed propounded before, especially in Chap. 7. as also the 8th & 9th, which it is needless here to repeat, since they concern not the seed and soul of Man in particular, but the seeds and souls also of Plants and Animals; and *Fienus* himself confesses they are but weak, and also answers them, *de format. fœt. quæst.* 5. But because he adds two which he counts more strong, I must not let them pass. The first (and so the fourth objection which also we propounded before Chap. 9.) is this: Neither the Blood nor the Spirits are animated, *Ergo*, consequently not the Seed. He proves the Consequence, because the former are produced in parts much more noble than the Stones, viz. the Heart, Brain, Liver; which if they could not bestow a soul upon the Blood and Spirits, neither can the Stones do it. But it is there also answered, that the seed is the fruit of a living body, and far more noble and excellent than the Blood and Spirit.

His second Argument and so the fifth objection is: if in the seed of a Man there were a soul it should be either Rational, Sensitive, or Vegetative. But it can be none of these. That it cannot be Rational is proved, First, Because if it were rational, the seed of a Man being in his Testicles or Parastate should be a Man. Secondly, The spilling of a Mans Seed upon the ground should be Man-slaughter. Thirdly, The Seed cast upon the ground must be Baptized, lest the soul should be damned eternally. Fourthly, If the seed were animated with a rational soul, the seed of a Woman should be no less animated than the seed of a Man: and if the seed of a Woman were animated she might engender by her self. Fiftly, if the rational soul were in the seed, either it should be the soul of the Parents extended in the seed, and divided and multiplied according to the division of the seed, or it should be some soul bred anew and produced in the seed or infused by God. But al these things he counts to be absurd. First he conceives that the soul of the Parents cannot be multiplied, because then it would follow, that the rational soul is divisible and consequently mortal, and that all Men have one soul, and that our soul should be a particle of our Fathers soul; and the soul of our Father a particle of the soul of our Grandsire; and at last al our souls shal be particles of the first man, and so communicated by Generation. Al which things he counts to be false & different from the Catholick Religion. Also he saies the soul cannot be produced afresh from the soul of the Father, for so it should be drawn out of the power of the matter and become mortal: nor that it is infused by God, and Created in the Testicles; because there it could never come to a perfect state, &c. Nor does he conceive the Soul to be in the seed, because since a Man hath two Testicles and a Woman hath also two, if in Copulation animated seed should fal from four Testicles, four souls should be united, or one should be coagulated of four glewed together. Secondly, Because then the seed of Animals should be a Plant; and a Man before

he should arrive to a rational soul ought to pass through the form of a Plant, and afterward through the Form of a Bruit, and be once an Ass or a Dog. Thirdly, Because that Vegetative Soul should be produced by a Rational soul existent in the Testicles, which cannot be, because the Rational Soul cannot have the power to produce a Vegetative Soul, since those souls are species distinct one from another. And many other absurdities he objects in case we shal say that the Vegetative Soul is in the Seed, which for brevities sake I omit.

But I wonder that so renowned a man, and who in the beginning of the foresaid Book writes, that no man had found out the efficient cause of shaping a man in the Womb, or if some few had smelt it out, they had neither cleerly opened nor by any reasons maintained the same, but that he would prove his opinion with such firm and evident reasons, that no man should afterwards have occasion to doubt, should use such frivolous and light reasons in so serious a matter. For first of all intending to write accurately of the Efficient cause of the Childs formation, he ought to have remembred that a Physitian must borrow many things of the natural Philosopher, that he may attain to the knowledg of the Subject he is to work upon; but because he doth not equal Causes with their Effects, nor adjuncts with their proper subjects, viz. such to which they belong primarily and of themselves, and inasmuch as they are such, his discourse breeds no true knowledg, as *Jacobus Zabarella Lib. 2. de Method. cap.* 11. teaches. For since it is not Man alone that is formed in the Womb, but also other Animals which bring forth live yong ones; moreover Animals are hatched out of Eggs, Plants are formed out of their Seeds: he ought to have enquired in general of the Generation of all Animals, yea of all living things, and what Cause did shape both Plants and all Animals; and the Cause being found, to consider whether it belong to a Man also, or whether we are to hold a peculiar Cause of the Conformation in a Man, and to render a Reason why that power which forms other Animals hath not place in a Man, but that another ought to be sought out. Again, he ought to demonstrate and not barely suppose it as a thing granted, that there are three sorts of souls in a man, and not one furnished with divers Faculties. Thirdly, he ought also to have noted this, that not the Seed of the Man or Woman alone does suffice to produce the Child, nor is the seed cal'd a Conception whiles it is in the Testicles, but when both Seeds are joyned in the Womb, which things being observed he might easily have answered all his own Reasons. For in the first place, he might easily have marked that the Seed of a Man whiles it is in the Testicles does not suffice to Generation, and that therfore when it is shed upon the ground it needs not be Baptized, nor does the Womans Seed alone suffice for Generation. And whereas he conceits that it is false, absurd, and different from the Catholick Religion, that the Soul should be propagated from the Father to the Son; indeed it is not agreeable to the Doctrines of the Schoolmen, but it is nevertheless most true and agrees with the holy Scriptures. For how shal that Precept *Encrease and Multiply* be fulfilled, unless from the first Man and Animals at first Created all the Men and Animals that do live and have ever lived unto this day had received their Souls? And in *Genes.* 46. 26. it is said that Sixty six Souls came out of the Thigh of *Jacob*; and *Exod.* 1. 4. that the Souls that came out of the Thigh of *Jacob* were Seventy, which I nevertheless do leave to the consideration of Divines. Nor does it hence follow that al men have one Soul or that the Soul is mortal. The first Man had one Soul from whence al came. Nor is there any reason that the Soul of Man if it be multiplied should be mortal: for the Creator commanded that it should be multiplied, and nevertheless it was his pleasure it should be immortal. Which things being granted, al the rest falls to the ground, so that there is no need of an Answer. Also it wil appear from what shal be said against the sixth and seventh Objection, what is to be answered to the rest; and that though the Soul be communicated from the Father and Mother, that yet it is not compounded.

With what Soul the Seed is animated.

Sixthly, Some late Writers do thus argue; Either the Seed is animated by the Soul of the Parent, or by its own proper Soul. Not by that of the Parent: for then the Soul of the Parent should become the Soul of the Son; and should go out of the Parents Body with the Seed. Nor with its own Soul; because since both Parents contribute Seed, the Son should then have a double Soul, or one should grow to the other and it should be compounded.

But if this Argument were objected against the Generation of Plants and brute Animals, that which a man should then Answer may here also serve for an Answer. Moreover, I say in general that both in Plants, Bruits, and Mankind, the Seed is animated with the Soul of the Parent, viz. according to the sort; for otherwise like would not beget its like. Also

true

true it is, that the Seed hath its own Soul, and that numerically different from the Soul of the Parent. Yet thence it does not follow, that after this manner the Soul passes out of the Parents Body with the Parents Seed. For the Soul of the Parent remains perfect and entire, although it multiplies it self. And as it does not follow, when in augmentation and in the shooting forth of the new Boughs on a Tree the Soul diffuses it self into the new matter and cloaths it self therewith, that it goes out of the former Body: so it does not follow when it communicates it self to the Sed, that it goes out of the Generator. For this is the force of the Divine Benediction, that the same Soul remaining perfect and entire should be able to multiply it self. And whereas it is said that the Soul of the Son should be double, or compounded, this may easily be answered by those who hold, that the Seed of the Father or the Mother only is prolifical. Nor do they want an Answer, who say that the Seed of both the Parents is prolifical; and before *cap.* 9. we have answered thereto, viz. how that the Souls being of the same sort when they are joyned together do not make a compound; and it hath been said before Chap. 9. out of *Scaligers Exercit.* 106. *sect.* 6. that of three stems of a Palm joyning together one Palm-tree is made, and a flame made of ten Torches or Links is called but one flame, and not a compounded flame. And if it be commonly said without absurdity that the soul is totally in the whol body, and totally in any part; why should it be absurd to hold that the soul is totally in the Mans seed, and totally in the Womans? And moreover, as the whol soul is said to be in the Eye, the Brain, the Heart, nor does it therefore follow that one soul is compounded of many souls; but this continues stil a truth, That it is one Soul which informs the whol and al its parts: so although it be said that the seed both of the Man and Woman is animated, it does not therefore follow that one soul is compounded of two souls, or one made up of two.

The soul of the Parent in generation remains entire.

Another forms the same Objection after this manner: if the Soul of a man be propagated, it is done either by cutting off some part of the soul of the Parents, or by the instrumental efficiency of the seed, or the soul of the child is immediately produced from the soul of the Parents, so that the seed hath no hand in the production of the soul, but only causes the dispositions, or at most is the Vehiculum of the soul by which it is carried from the soul of the Parents into the Child.

But al these Objections arise from ignorance, because they know not the nature of the soul, nor how that saying is to be understood, that every form and soul does multiply it self, and how that Divine Benediction, *Encrease and multiply*, hath hitherto been effected, and is stil effected: but if they did diligently consider, and in the first place search out how souls are multiplied in Plants and Animals, also the manner how the same is done in Mankind, if (I say) they understood these things as far as they may be known in this darkness of our Minds, they would not invent so many absurdities. For the last (if rightly explained) is true, viz. That the seed (understand the body of the seed) is the Vehiculum or carriage, by which the Soul is communicated from the Parents to their issue: which action is called traduction or delivering over, the word being borrowed from Plants. For as in Trees in which the seminal faculty is diffused through their whol bodies, if any part be cut off, and grafred upon another Tree, the soul of that Tree from whence the branch was taken is communicated to the Tree upon which it is ingrafted: so with the Seed the soul of Animals is transplanted into the womb of the Female, and so from that seed endued with its soul a perfect Animal does spring up. But as, when a branch is cut from the Tree with its Soul in it, that Tree neither loses its soul, nor does that soul become less: even so when the soul of the Parent in the seed is delivered over unto the issue, the soul of the Parent remains intire. And as when in augmentation the soul is communicated to the aliment flowing in, the soul which is in the rest of the body does not become lesser; and as when from a root or stem of a Vine, or the root of an Hop, many and long branches grow up in one Summer, all which receive their souls from the root and stem, and yet the soul is totally in the yong branches, and totally remains in the old stock or root, not being made lesser: so also the soul of the Parent is transplanted with the seed into the child, it self nevertheless remaining entire. And this multiplication of souls presents an image of the immense and infinite God, who (as *Julius Cæsar Scaliger* speaks) *reigns every where without place, al without al things, and the whol without parts.* I said an Image. For God the Beginning of al things is an infinite fulness, filling al things, whom neither the Heavens nor Earth do contain, totally existing within the World, totally without, and yet restrained within no limits. But our soul indeed is joyned together by dimentions, and its fulness is only so large as the body is, and bodily dimentions: yet though we should suppose a body to grow from the smallest quantity

The Traduction of the Soul what it is.

to the greateſt bulk, the ſame ſoul would fil it al remaining the ſame without any Addition. Alſo in like manner, though an Animal generate often, and the ſoul multiplies it ſelf, and communicates it ſelf to the iſſue, it is not diminiſhed of any of its parts as having none. Of which we have ſpoke more largely before, Chap. 9. Which things it were better attently to conſider, than to oppoſe the truth though far out of ſight.

Eightly, Neither are thoſe things of any great moment which *Aphonſus Caranza* here objects, and whereby he would prove, That the Rational Soul is infuſed at the laſt when the body is perfected. For in the firſt place, as to that place in *Exodus*, 21. which he cites out of the Septuagint, and proves afterwards from *Philo*, *Lib. de ſpecial. leg.* viz. If the Infant were not ſhaped he that ſtruck the Mother ſo as to cauſe Abortion ſhould be fined, but if it were ſhaped he was to be puniſhed as a Man-ſlayer. I (truly) wil not put my ſickle into other mens Corn; yet thus much I ſay, That which he alleadges is not in the Hebrew text, nor can it be proved thereby that the ſoul is not preſent at the beginning of Conception. And let us ſuppoſe there was ſuch a difference of penalties, and let the Civil Laws and Lawyers here quoted by *Caranza* retain their Authority: yet thence it no waies follows that the Seed is not animated preſently upon the Conception. The Law-givers perhaps, and the Lawyers had their Cauſes known at home, into which I ſhal not now enquire, and which I leave to their place, why they would otherwiſe puniſh him who deſtroys a Conception perfectly ſhaped, than they would do him that deſtroys one leſs perfect; and this perhaps amongſt the reſt was not the leaſt, that before the Child begins to be moved there is no ſuch great certainty of its life, and many things might happen to it in the Womb, although no external cauſe was added, which might take away its life before it came to ful perfection; ſo that what *Hippocrates* ſaies of the Child born in the eighth month, *it is not, and it is*, that may much rather be ſaid of ſuch an imperfect Conception; and therefore they would inflict a greater puniſhment upon him who ſhould deſtroy a perfect Child, and upon him a leſs that deſtroyed an imperfect one of leſs hope, and ſubject to more caſualties. Mean while I conceive it never entred into the thoughts of the Lawyers, that by their Laws they would derogate from the principles of Nature, and oppoſe ſuch things as Natural Philoſophers and Phyſicians (to whom in ſuch Queſtions they alwaies appeal, and whoſe Authority they reverence) do demonſtrate by moſt firm reaſons to be true. Which appears moſt evidently by *Auguſtus*, *conſtitut. quart. part.* 4. whereby it is inacted that he ſhould not be puniſhed by the Sword, but according to the diſcretion of the Judg, who gave a Medicine to procure Abortion, if the Child were not yet quick, and was caſt forth before the middle time, reckoning from the Conception. No man (certainly) wil ſay that a Child is not quick at the end of the fourth month, and at the middle of the time betwixt the Conception and the Birth, ſince al men count the fortieth day the longeſt term in the ſpace whereof the child receives the Soul. Yea, and before the Nativity the Lawyers count not the child a man, *per text in L. cum inter Veteres*, *Codice de fidei commiſſ.* But what Natural Philoſopher wil ſay an Infant is not a Man til he is born? And therefore by a vital child the Civil Laws underſtand ſuch an one in which the manifeſt ſigns of life appear, eſpecially from the motion thereof, which firſt happens about the middle time of Conception. Concerning which thing *Thomas Fienus* does alſo wel write in *Apolog. adverſ. Sanctacruz*, That he who kils an animated Conception, however ſmal or imperfectly organized, wanting yet ſenſe and motion, is a murderer no leſs than if it were perfect; but it does not thence follow that al homicide ought to be puniſhed alike; ſince though both are alike perfect eſſentially, yet are they not alike accidentally perfect. Would not (adds he) any man think that a greater injury was done him by him who had hewn him down a very tall and fruitful Pear-tree, than by him that ſhould pluck out of the Earth and break a ſmal branch only, a foot high, newly planted, and that therefore he is worthy of greater correction, and more ſtripes.

Nor is that argument which he brings in the Second place, of any great moment; whereby he concludes, Becauſe God made *Adam* of the ſlime of the Earth, and when he was formed and faſhioned, breathed into his face the breath of Life; that therefore in Generation alſo the Rational Soul is not infuſed before the formation of the body. But Creation and Generation are of a different Nature. The Woman was created of the Rib of the Man, yet is ſhe not ſo generated.

But in the third place, I admire that a Chriſtian ſhould endeavor to prove by that action of *Hippocrates*, *de Nat. pueri*, That the Rational Soul is not in the Child the firſt daies. For inaſmuch as *Hippocrates* adviſed the Dancing Wench with child, that within the ſixth day

day she might cast out the seed by dancing, he conceives that *Hippocrates* thought that the seed retained so long in the Womb had not the rational soul in it; for otherwise he would not have perswaded her to cause Abortion. Moreover he brings for the same the Authority of *Aristotle*, who *Lib. 7. polit. cap.* 16. allows the destruction of a child in the Womb as long as it is not furnished with sense and life, as if he did suppose that the Conception was without life some notable space of time. But *Johannes Baptista Sylvaticus*, because of this very place, does conceive (and that not without cause) that the Book was not written by *Hippocrates*, *Controvers.* 32. and if it were written by him, yet this Counsel of his is by no means to be allowed, but is to be reckoned amongst the foolish Imaginations and Ratiocinations of the Pagans, of which St. *Paul* speaks *Romans* 1. 21. And the like reckoning we are to make of that same destroying of Conceptions used by the Heathen, of which *Aristotle* speaks, *Lib. 7. politic. cap.* 16. And therefore also that Decree of the Canon Law, in *Decreto in cap. sicut ex Literarum, de Homicidio*, where a Monk by whose assistance a woman had procured her self Abortion, is not counted irregular, and is allowed to say Divine Service, because the Child (as was thought) did not live, is by *Franciscus Ranchinus*, a most learned Physitian, in his Commentary on *Hippocrates* his Oath, rightly termed unjust, and that distinction faulty.

If yet any further Objections may be made against our Opinion, their Refutation is sufficiently apparent from what hath been said. The sum whereof comprehended in the words of a certain great Divine, is this: An whol Man according to the Primitive Ordination of God begets an whol Man. An whol Man I cal a Male and Female, who are made into one flesh, or become one flesh, *Genes.* 2. 24. *Matth.* 19. 6. *Ephes.* 5. 31. Now the Parents generate inasmuch as they are men, that is, according to that which belongs to the whol species or sort of Mans Nature, in vertue of that Divine Word, *Gen.* 1. 28. *God blessed them, and said, bring forth fruit, and multiply and replenish the Earth.* And they generate by the conjugal conjunction. Nor does the male ingender alone, nor the female ingender alone, not the Body only, nor the Soul only, but the whol Man, viz. Male and Female coupled according to the Ordination of God, And therefore a Son or a Daughter proceeds not from the Father alone, or from the Mother alone; but the Son and the Daughter is from the whol Father, and the whol Mother, and equally the Son and Daughter of the one as of the other; and as the Generation of the Parents is common, so the work of Child-making or Filiation, is common to both as to Nature.

The Conclusion.

And thus I conceive I have delivered the true Opinion concerning the Generation of living things, and the propagation of Souls by the seed from the Parents to the Issue, both in Plants and Animals, yea, and in Man himself; and established the same by firm reasons, and refuted the Objections of those that are contrary minded. In the mean while by the admonition of *Scaliger*, *Exercit.* 297. I see, observe, and remember, how weak the sight of our mind is, to search into the secret Closets of Nature; and I hear al learned men in a manner (especially in the Question of the Original of the Humane Soul) complain of the obscurity and difficulty thereof. And therefore I also (peradventure) may be deceived and err. Yet this I conceive I have demonstrated by a most firm reason from the Act to the Power, and from the Power to the Act, or Form and Soul, that there is the Soul in the seed both of Plants, and of Animals, and of Man himself (whether it be propagated by the Parents, or sent in by God) as soon as ever the formation of the living body begins. And this Tenet I shal so long maintain til it shal be to me demonstrated how without the souls presence this work of the formation of a living body can be performed. Which unless it can be done it wil be the part of a mind studious of the Truth not to labor how to oppose that most firm demonstration by certain Objections, and so to render it suspected, but rather to be careful how to answer his own doubts. For *Julius Cæsar Scaliger*, in *Lib. 1. de Plantis*, writes from *Aristotle*; where the thing it self is apparent, and Opinion opposes the thing, we must seek a Reason, but not be ignorant of the thing. Now that thing is appa-

rent which is demonstrated by most firm Reasons. And here at last I solemnly protest that I acknowledg and confess the Excellency and Eminency of the Humane Soul, and its difference from the Souls of Bruits; that it alone bears the Image of God, is separable from the Body, and immortal. And therefore, if I have said any thing (as I hope I have not) which may really oppose this Prerogative of the Soul, I wish it were unsaid. But whether the propagation thereof from the Father to the Son, do that, and whether therefore it must necessarily be held to be immediately infused into our Bodies by God; I leave that to the Judgment of every Man. What seems to me most probable I have freely declared.

THE

THE FIFTH DISCOURSE.

Concerning the Spontaneous Generation of Live Things.

Chap. 1. *False Opinions concerning the Spontaneous Original of Living Things.*

BEsides the Generation of Living Things of which we have hitherto spoken, and which, because *like* evidently Generates its like, is commonly termed univocal Generation, there is yet another, which because therein *like* is not thought to generate its like, it is called vulgarly Spontaneous and equivocal. So, of Horse-Dung those flies are Generated which we cal Beetles, of Corne a certain Worm called in some places a Wibble, of Beans another sort of Worms, of Wood another, of the foulness of the Skin and Garments Lice and Fleas, as also out of Cheese and Flesh and other putrefying things Worms and Insects commonly so called, of sundry sorts do arise, as shal afterward particularly appear, The consideration of the Generation of which kind of Living Things is necessary and not unworthy the Cognisance of a Natural Philosopher; which very thing *Aristotle* did hint, when 1 *de Part. Animal. Cap.* 5. he thus wrote: *With a certain Childish scornfulness to despise the disputation and Consideration which may be had concerning the meanest Animals, and to count it tedious, is no way beseeming a Philosopher; since there is nothing in Nature in which there is not somwhat to be admired.* And as it is reported *that* Heraclitus *said to those that came to speak with him, and because they happened to find him sitting by chance in a Bakers Cottage to Warm him at the Oven, they would not go to him, as abashed at his homly manner of sitting in such a place: for he bid them enter boldly, since even this place* (quoth he) *is not void of the presence of the immortal Gods: the very same may be said touching the Inquisition into the Nature of Animals. For we ought to contemplate and discuss all things without shame; since in all things the Divinity of Nature and her Honorable and Beautiful contrivance is conspicuous.* And that so much the more diligently, inasmuch as few have written any thing that is solid and agreeable to truth, concerning this subject. Above all others the most Renowned *Fortunius Licetus* Professor at *Padua* hath written most diligently and largly of this Matter, in his 4. *Books of the Spontaneous Original of Live Things.* As for me, though I acknowledg the difficulty of the matter, and am well aware that it is dangerous to hold any thing different from the vulgar opinions, and liable to detraction, especially in this subject: yet I had rather freely shew my judgment in an obscure matter and contribute mine assistance, then to cease from the investigation of truth. Let every one follow what Opinion he pleases. I obtrude mine upon no man. And if any man will shewe me better, I shall willingly assent unto him.

The generation of Live things how manifold.

Now this Generation, as hath been said, is by some called Spontaneous (*Aristotle* 1 *de Generat. Animal. Cap.* 1. saies that such Creatures are Generated *by Nature working of her own accord*, and thence *Julius Cæsar Scaliger* borrows the Phrase of *Automatismos*, production of it own accord, *Exercitat.* 168.) the word being transferred

Spontaneous Generation what it is.

ferred from moral actions to Natural. For *Scaliger* conceives, *Exercitat.* 77. *Sect.* 1. that this Adverbe *Sponte*, (of it own accord) was derived *ex sponsionibus*, from promises. Now all promises are voluntary and free. And the same *Scaliger* conceives *Exercitat.* 140. that it cannot be accurately or properly said, that a Tree grows *Sponte* of its own accord. But the word seems to be more general, and to be opposed to that which is against ones will, or to that which is not done save by an external Agent, and contrary to Natural Inclination. And therefore, as it is attributed to other actions which are performed by an internal Agent, no external Cause concurring, so also it is attributed to Natural Generation. Whence *Virgil.*

Such Fruit he plucks as the free ground affords,
And gentle Trees bear of their own accords.

But in more special manner it is attributed to those Generations, the efficient cause whereof lies concealed in the thing it self, and is not so manifest to the senses, and when that which is Generated breaks out of its own accord as it were without Seed. Of which *Virgil.*

For some things grow even of their own accord without mans Labor. And,
Such things as of their own accord do grow.

Equivocal generation

It is vulgarly called *Equivocal* Generation, *viz.* Because the cause of such Living things is not thought to be of the same kind with the thing ingendred

what things are Generated of their own accord.

But what things they are which be thus Generated of their own accord is a question. It was an old Opinion, that all Brutes, Yea and Man himself, did at first grow out of the Earth. Which *Plato* teaches in *Menexenus*, as also other Philosophers much Ancienter then *Plato*: after whom followed the Poets in this Opinion. *Lucretius* hath these Verses.

Hardly small Creatures now She makes at last
Who all things made and Beasts with Bodies vast.
It is not therefore without Reason good
The Earth should bear the Name of Mother-hood.
For she mankind out of her Bowels Spun,
And all the Beasts that on the Mountains Run
Her teeming Womb did at fit Season Bear,
And many fashion'd Birds that flie i'th' Air.
But since 'twas fit that She some end should make
Of teeming Labors, and her Quiet take;
She now leaves off like Wife worne out with Age.

And Juvenal, *Satyr* the 6.

For in th' Earth's Non-Age, under Heav'ns new Frame,
They stricter liv'd who from th' Oakes Rupture came,
And Clay-born had no Parents.

And *Virgil* in the Second Book of his Husbandry.

When first all Cattle their Beginning had,
When of the Earth mankinds hard race was made.

But these Opinions had their Original from the History of the Creation of the World. For having doubtless hard somwhat thereof, from the writings of Moses, they turned the truth into these Fables; and since in the Creations History it is said, that God commanded the Earth should bring forth the Living Creature in general after its kind, the Beasts and Creeping Things, with Cattle according to their kind, and that God made Man of the Clay of the Earth; (but they in the mean while knew not the Creator:) they thence invented this same Spontaneous Original of things out of the Earth. This Opinion is also by some attributed to *Avicenna*. But it is not credible that *Avicenna* so great a Philosopher should follow so Fabulous an opinion. *Avicen* indeed writes *Lib.* 15. *de Animalib. Cap.* 1. *As men might cut themselves off from Generation, either by their own free will, or by Pestilential Air and so come all to die, and then if a man should be made he would Generate, and so the*

whether Avicenna held that Men could grow out of the Earth.

kind

kind would be renewed: and making and engendring would mutually assist one the other, in preserving the kind. But the sence of those words is this: if all Men should perish, either voluntarily, forbearing to Generate, or Slain by Pestilence, if after the Death of all Men a new man should be made, which way soever, whether by Gods Creation or any other means; he being a new man cannot be thought to want the power of engendring other Men like himself, by which the kind might be maintained.

The efficient Cause of Living things Generated of themselves

Now concerning the original and efficient Cause of such living Things, Authors do very much dissent. *Cardanus Lib. 9. de Subtil.* saies that such things as are said to be Generated of their own accord are Generated by Fortune and Chance. But therein he is out. For Chance and Fortune have no hand in Natural things, and whatsoever things are made by Chance and Fortuitously, they are not alwaies engendred of the same principles and after the same manner. But things which grow up of their own accord are alwaies bred of the same Principles, and after the same manner, and have certain efficient Causes, which also act for a certain ends sake, and produce certain effects. So, of Horse-Dung Beetles are bred, and not Earewigs; out of Cheese Mites, and other kind of Worms out of flesh, and in general, alwaies things determinate breed of such and such things; Yea, and they are born at a certain Season too; and the kinds of flies, Ear-wigs, Worms, Beetles and Butter-Flies do all spring and perish at their certain Seasons. And although as *Cardanus* Objects, in sundry places on the Earth, in the Waters, in dead Carkasses and elsewhere, we see the same things bred: yet they are Generated of a determinate matter, which may be found in divers places frequently. And although it may happen, that the matter which is fit for the Spontaneous original of things may in some places be collected by Chance: yet that matter is determined, nor are living things made thereof by Chance, but the next efficient is determined, and alwaies acts after the same manner. Nor matters it that such things as arise Spontaneously are less perfect (an Argument whereof they take to be their not Generating) and therefore cannot have the notion of an end, and so seem to be made by chance. For though compared to others they are somwhat imperfect: yet in respect of their own essence they are perfect, are Nourished, Augmented, Moved, and perform operations befitting their species. But that conceit of theirs is false, when as they imagine such things do not Generate; since even the very least and most ignoble of these kind of Creatures do couple and Generate, as *Aristotle* teaches every where, and especially in his *5. de Histor. Animal*: and Experience also it self doth testifie as much. And although in comparison of other Creatures they seem ignoble, yet are they necessary for the perfection of the whole Universe, as shall be said anon from the *Exercitation* 250. of *Jul. Cæsar Scaliger*: and that *Avicenna* wrote well when he said it was better Lice should be bred, then that putrid matter should remain in that condition, is the Opinion of Learned men, who acknowledg a rare piece of workmanship even in the structure of a Louse. For if in the first place we consider the prime Work-Master of all things, he that he might discover his infinite Wisdom and Omnipotency, had rather that living Creatures should be multiplied in the world, then corrupt and putrified matter void of Life; and it is his pleasure, that the bodies of more perfect living Creatures, when they are corrupted should not turn simply to putrid matter, but into more ignoble Animals. Hence, from the parts and Excrements of Animals, from Plants and their fruits sundry sorts of living Things do proceed, and from such and such determinate Things such and such determinate Creatures arise and no other. So thought and wrote *Jul. Cæsar Scaliger*, who *in the forecited place* thus writes: Man was made for God, the world for Man. And soon after: Man is the Prince of Animals. Now man should not have been Prince, if he had not been made as he is, *viz.* in the middle. Nor could he be in the middle, unless betwixt extreams. They were therefore made for the Mediums sake. Now if any of the extreams, or of those things which are seated betwixt the middle and the extreams, were wanting, there would be a vacuum amongst the forms. Which would be a greater fault in Nature, then a *Vacuum* in Quantity without a Body. For what is more absurd then a middle without Extreams? which *Austin* also taught long ago, *de Civitate Dei Lib.* 12. *Cap.* 4. It were Ridiculous (saith he) to imagine that the faults of Cattle and Trees, and other Mutable and Mortal things, which want either understanding

or Sense or Life, should be damnable: since those Creatures have received that manner by the appointment of God, that by giving way and succeeding they might accomplish the lowest pulchritude of times, in their kind, agreeing to those parts of the World. And a little after: the comlinesse of which order therefore doth not delight us, because we according to this our mortal condition being Woven in as a part thereof, we are not able to discerne the whole, to which those particles which offend us do very aptly and decently agree. *And again*: Nature considered in it self and not with reference to our commodity or discommodity, gives Glory to its Work-Master.

Whether things generated of them are produced only by the common Cause.

Others though they do not hold that such things are bred by Chance or Fortune; yet they conceive they have no other immediate Cause efficient, but only the common and remote one, in which opinion is the *Conciliator*, who *Differ.* 29. doth make this difference betwixt other Living Creatures and those which breed of themselves, because the former besides the Universal agent, *viz.* The Heaven, do also require a particular one, since the Sun and Man Generates a Man; But the latter want an immediate Cause, and are produced without a particular agent. And the Name it self seems to say as much. For since they are said to arise of their own accord, that seems to hint, that they have no external immediate efficient Cause distinct from themselves: for else they would not be said to be Generated of themselves. But in very truth, there ought alwaies to be a proportion betwixt Causes and Effects, that Universal Effects may have Universal Causes, and Particular Effects Particular Causes, and General General, and Special Special. And if it were not so, no demonstration could be made; which is not made by the immediate Cause, and so no demonstration nor science can be had of such thing as are generated of themselves. Moreover, the common and remote Causes are all external and manifest. But that such things as grow of themselves do arise from an internal Cause lying hid in the matter, we shall shew anon sufficiently. Moreover, since there is a great variety of things which breed of themselves, and differences, and certain sorts, they verily cannot all proceed alike from one common Cause, but to every sort its next special Causes must be assigned. And that those common Causes do not suffice doth hereby also appear, that which way so ever they turn themselves who defend this Opinion, they cannot disintangle themselves. Whence they are divided into sundry Opinions concerning that remote Cause.

Whether they receive their Soul from God.

Scotus held that the Souls of these kind of Creatures do proceed from the most high God immediately. But the Generation of al living Things is Natural. And therefore a Natural Cause ought also to be sought out; nor must we presently run to God, who having created and constituted Nature, doth now produce nothing immediately and miraculously. And since the original of Plants and other brute Animal is from their Parents by means of Seed, but not from God, save as a remote and universal Cause, shal God be the immediate Cause of such Ignoble Animals? Nor do the two Reasons which *John Duns Scotus* brings for his Opinion any waies prove that God may rather be said to be the Cause of these Spontaneous things then of such as arise from Seed; as *Fortunius Licetus* doth prolixly examin his Opinions, *Lib.* 1. *de Spont. Vivent. Art. a Cap.* 77. *ad* 84. Nor do I think fit to spend time in a plain Case.

A place out of Luther concerning the generation of these kind of Creatures.

Luther upon *Genes. Chap.* 1. *verse* 20. thus writes: If you ask by what virtue this Generation is caused, which they term *Equivocal*, *Aristotle* answers, that the putrified Humor is cherished by the Suns heat, and so a live Creature is produced: But I doubt whether this be a sufficient Reason. For the Sun heats, but generates nothing, unless God say by his divine power, let a Mouse come out of that putrefaction. A Mouse therefore is also a Creature of Gods making &c. and a little after: therefore we do here also admire the Creature and work of God. And the same may be said of Flies.

From this Opinion *Johannes Gallego de la Serna* the Spaniard dissents not, *de Princip. Generat. Lib.* 1. *Cap.* 3. who holds God alone to be the principal cause in this kind of Generation, and writes, that though every Univocal cause cannot produce its individuals, unless God as the first cause concur with its action: yet God concurs with each after a different fashion, according as the Generation differs more or less from the Equivocal kind, in which God alone operates as the principal Cause.

cause. And in *Chap.* 4. he adds, that these weak kinds of living Creatures do need a more vehement concourse of God then those that have a greater ability to beget their like.

How God concurs to the generation of things.

But the most good and great God, (after he had made Nature, which is his ordinary power) is not alone the next and immediate efficient cause of any thing, but by his universal Concourse conserves all Natural things, and regulates their Generation; which concourse of his to restrain to one thing, (especially being more vile and ignoble) more then to another, and to hold that he is more vehemently and painfully busied in some imperfect base thing, then in others that are more perfect and noble, is very absurd. *Scaliger* saies far more rightly and divinely, *Exercit.* 1. *That power* (saith he) *of God took no more pains in building this universe, then in making the basest tree: nor did it express more subtilty when it made that by its Virtue the Load-stone should have a cause in it self restraining the efficiency of attraction, then when he gave to the first matter the form of Air, that it might ascend. For in his works there is the greatest Equality.* And in 2. de Plantis. *God, neither idle nor laboring; neither in nor without worke; but without worke the Head of the work, the beginning, the Middle, the End, the whole; and that in one word I may Express all, Compass all, Transcend all:* He himself, *by whose most simple and indivisible understanding of himself all the Worlds were made: so that all have their own End and Order.*

Nor doth *Franciscus Suaresius* think any righter, Who, *in Disput.* 18. *de Causis Proxim. Effic. Sect.* 2, *Num.* 33. writes: that the Heaven indeed by its own proper Virtue cannot make Souls; yet that it makes them by the power of God, as the Author and general provisor of Nature, who by his greater assistance can supply whatever virtue is wanting in the immediate Causes. But the answer is the same which was given to the other Opinion. For since God created all things very good, he also furnished them al with necessary forces, and consequently here is no defect, no weakness, which need to be supplied either from Heaven, or by the extraordinary assistance of God.

Others therefore take pains indeed to find out this immediate cause, but all unhappily, whiles they seek the same out of the matter, and not in the matter, and define Equivocal Generation to be that in which the efficient out of matter which came not from nor out of it self, but is of a quite different Nature, generates a thing specifically unlike it self and its own form. But none of them hath been able without Absurdity to say or shew what that efficient is, and how it could Generate a thing specifically unlike it self, and its own form.

Whether the forms of these Creatures is made by Intelligences.

Avicenna held that an Intelligence Subordinate to God, whom he calls *Colcodea*, doth produce the Souls of these things. But it is not yet proved, that there are such Intelligences from which things Natural proceed. For from God alone as the first cause of all things, and Nature, all Natural things proceed. Nor is Creation to be attributed to any other thing but God Omnipotent. But the immediate efficient Cause of Generation ought to be like, either in sort, or in the next kind, to that which is Generated. And therefore these Spontaneous live-Things cannot arise from a Cause of a quite different kind from themselves, since they are Natural Bodies.

Whether they are generated by the Heaven.

Thirdly, Others hold the immediate efficient Cause of these Bodies to be the Heaven. But this Opinion will not hold Water, more then the other. For in the first place, the Heaven is the common cause of all things Sublunary, as Subservient to their Generation: and therefore it cannot be said to be only the immediate cause of these Spontaneous Creatures, for the Heaven after its fashion advances the Generation of these kind of Creatures, and of such as engender one another, all alike; nor can any Reason be assigned, why it should rather advance the Generation of Spontaneous things then of others. For if they will run to Heaven for want of an immediate Cause, we shal declare sufficiently hereafter, that it is not wanting neither, in the Generation of these Spontaneous Creatures. Moreover, although they that hold the Heaven to be the Cause of this Generation do sundry waies endeavor to declare the same: yet none of them do sufficiently explain the matter: For some, as *Averroes*, do hold that the heat of Heaven is the efficient Cause of these Creatures: or that these Creatures are produced by the Heaven, by help of its heat. Others (as *Albertus Magnus*) do hold that the light of Heaven is the immediate Cause of the

Original

Original of things; others, the motion of Heaven, as *Thomas Aquinas*; others, the occult influences, as *Fernelius*. But which way soever they turn themselves, they help themselves not, but are still pressed with the same difficulty. For the Heaven which way so ever it acts, as was said before, is but a remote and universal Cause. But every effect requires an immediate Cause, and a special effect a special Cause. Moreover, Heat, Light, Motion, and occult Influences are accidents. But no substance, such as the Souls of these creatures are, can be produced by an accident. Some indeed do hold, that Heaven is not only an universal Cause, inasmuch as it affects all Sublunary things, but also a Particular, in as much as by a Peculiar Virtue it concurs mediately or immediately to the generation of all things. But neither is the knot thus loosed. Indeed I grant, that after its fashion the Heaven doth also particularly concur to the making of all things Sublunary, and that not one face of Heaven nor posture of the Stars, and influence thence proceeding, and seasons thereon depending, but sundry, are necessary for several Plants, when they grow, when their flowers ripen, when their fruit comes forth; and that some things spring at certain positions of the Heaven, and die away at other positions, and that doubtless there is a Peculiar Sympathy betwixt some certain sorts of things and some Stars. But the question is whether the heaven gives the forms which constitute those species: which we deny, and hold that the Heaven by its influx doth only stir up some first qualities in the Air, and also by an occult influence excite the forms of living Things, and cause them to buckle themselves to their proper operations. And so, as the Heaven in Univocal Generation so called, whiles the Sun and a Man do generate a Man, is not the next and immediate, but the remote and mediate cause: so also, in this Spontaneous original, it is not the immediate and next, but the remote and mediate cause. Which in Plants and Eggs is hereby manifest, in that even the heat also raised from Elementary Fire doth often perform as much. So the heat of a Stove can in the Winter cause, that forms which lie hid in Seeds will begin to rouze themselves up and sprout. After the very same manner Flesh also in the Winter time kept in an hot place will putrifie and breed Worms, as wel as in Summer. And as the Dugs of Virgins whiles by their heat they hatch the Silk Worms Eggs do not give a form to the Silk-Worms, nor the heat of the fornace doth not give to Eggs the form of Chicken: even so the Heaven doth not either by its heat or hidden influx give the form to these Spontaneous Creatures; but as it cannot ingender a Man without a mans help, so, unless there lie hid in the matter a seminal principle it can engender nothing therefrom. For the Heaven indeed may hold its course without inferior causes: but in the things themselves below it alone can ingender nothing without the concourse of inferior causes, they being in every Generation the immediate and principal agents.

Whether the Heaven be also a Particular Cause.

Whether these spontaneous Creatures do spring from heat.

Alexander, *Olympiodorus*, *Cardan* 9. *de Subtil. Libel. de Animal. quæ ex putred. Oriuntur*, (whom *Cæsalpinus Lib.* 6. *de Nat. Rerum, Cap.* 21. and others do follow) hold that the Spontaneous Generation of living Things doth proceed from the warmth of the Ambient Air, either as from an instrument of the Subcœlestial Nature, or as from a primary efficient cause. But since heat is an accident, it cannot act beyond its own forces, so as to produce a substance. Moreover, heat is only the instrument of vital actions; and therefore no primary agent.

Whether they proceed from the Soul of the world.

Others, as *Philoponus*, *Themistius*, and the *Platonists* most of them, do suppose that the Soul of the World is the efficient cause of these Spontaneus living Things. For so *Themistius* 1 *de Anima Cap.* 24. *That there is* (saith he) *an only and Universal Soul of the world, which gives to all living Bodies their Soul, or life if you will so call it, which is nothing but a certain vital and generative faculty, passing through all things Natural, those Animals which are Spontaneously bred of putrid matter do most clearly prove.* And *Marsilius Ficinus*, *Lib.* 4. *Theolog. Platon. Cap.* 1. writes, that the Soul of the World every where through Land and Water contains in it self spiritual and Vivifical Seeds, and generates of it self, wherever Corporeal Seeds are wanting, also it cherishes the Seeds left by Animals, and of a putrid Grape-seed it can generate a various orderly and precious Vine-Tree; and wherever a generator is wanting, and accidental qualities do only shew themselves, it performs generation, and undergoes the office of a generative substance. But in good deed, we have elsewhere shewed, that there is no Soul of the World. For though in Animals

sundry

sundry actions proceed from one Soul: yet it is not proved, that the world is after such a manner one as an Animal is one. And if the world indeed had a Soul, it should be only an universal cause, not an immediate, nor could any Reason be given why Spontaneous things should rather proceed therefrom then non-spontaneous: and of necessity a cause must be which in Spontaneous things should determine the same to this action, as there are specifical causes in the Generation of other living Things. Nor was it therefore to be constituted, that it might supply the defect of a next Cause, in things of Spontaneous original. For we shall hereafter shew that such a cause is not wanting in the Generation of those things. And how can so many sorts of things Spontaneously generated proceed from one Soul?

whether from the Soul of the Earth.

The Opinion of *Cicero* and *Seneca* differs not much from the foresaid opinion, who attribute that which the Platonists ascribe to the Soul of the World, unto the Soul of the Earth and Water, or of the Terrene Globe especially. For so *Cicero*, 2. *de Natura Deorum* writes: And if so be those things which are contained in Plants of the Earth do live and grow by the Art of Nature, verily the Earth it self is contained and held in by the same force and Art of Nature: forasmuch as she being ful of the Seeds of things, engenders al things, and pours plants out of her self, embraces, nourishes and encreases them: and she her self likewise is nourished by the upper and extream Natures. And *Seneca*, 6. *Quæst. Natural. Cap.* 16. 'Tis evident saith he, that the Earth hath a Soul. I do not mean that Soul only whereby she holds her self, and joyns her parts together, which is even in Stones and Dead Bodies: but I mean a vital vigorous Soul which nourishes all things. If She had not this Soul, how should she infuse Spirit into so many Trees which have their life from nothing else, and into so many Herbs? How should she be able to foster so many Roots, so different, in so various manners buried in her, some creeping in her surface, others growing deep downwards, unless she had plenty of Spirit, which generates so many and various things, and affords nourishment to the same? And *Marsilius Ficinus*, *Lib.* 4. *de Immortal. Animæ Cap.* 1. We know for a certain (saith he) where nutrition and augmentation follows Generation, there is Life and Soul. But we see the Earth by her own Seeds Generate, nourish and cause to grow innumerable Trees and living Creatures. Also she cause Stones to grow, as it were her Teeth, and Herbs as it were her hairs, as long as they stick fast by their Roots, which if they be plucked up and rooted out of the Earth they do not grow. Who will say, the Womb of this Mother is void of Life, which of its own accord brings forth and nourishes so many Children; which sustains its self, whose back brings forth Teeth and Hairs? The same may be said of the Body of the Water. The Water therefore and the Earth hath a Soul, unless perhaps some man will say, that those living Creatures which we (because they seem to have no Seeds of their own) say are generated by the Soul of the Earth, are not bred of the said Soul, but from the influences of Heavenly Spirits.

But as this Opinion differs not much from the former, so after the same manner it is easily refuted. It is truly manifest that much Air and Spirit is contained in the Bowels of the Earth. But that the said Air and Spirit is the Soul of the Earth cannot be proved. Nor are those Spontaneous living Things we speak of Generated only in the Earth and Water, but also in Animals and Plants, as sundry sorts of Worms. And if in the Earth there were such a Soul, she would not be less noble then her effects, but would also be nourished, grow, and exercise Senses. Also no necessity forced them to suppose such a Soul in the Earth. For it is most known that all other living Things have their Seed from whence they are Generated: and we shall hereafter shew that Spontaneous things are not without their immediate cause neither. And if there were indeed such a Soul, since it would be but one, it could not produce so many different sorts of Creatures, but of a determinate specifical Effect a determinate Cause is requisite. And though the Earth as a common Store-House doth afford nourishment to Plants and certain Animals: Yet it follows not, that she gives them their Souls. The Plants are first constituted by their Souls, before they draw nourishment out of the Earth. Nor doth the Earth of Her own substance afford nourishment to Plants, but only as a Store-House, in which are many mixt Bodies, which prove nourishment for Plants.

Erastus

whether Plants Spring up of their own accord by reason of a faculty implanted in the Earth.

Erastus dissents not much from this Opinion, *Part. 2. Disput. Contra Paracelf.* who makes the divine power implanted by God in the whole matter at the first Creation the Author of such effects. But he doth not prove that ever God gave to the whole matter such a power. God produced Plants and Animals out of the Earth and Water, and put into all of them their forms, and commanded every sort of Plants and Animals to multiply themselves, and to bring forth Seed and Fruits according to their kind: but that God gave the whole matter out of the sorts and kinds of things a power to produce Living Things, is no where read in Scripture. But whether this Opinion may any way be tolerated shall be expressed *in the following Chapter.*

whether from a spirit produced from Heaven?

Franciscus Picolhomineus, concerning things springing from putrid matter, Chap. 3. held that living Things which spring of their own accord without Seed do arise from a spirit produced out of Heaven. For thus he writes, among other things: *Towards the Generation of Animals which arise out of putrid matter, the Sun or Heaven performs after a sort the office not only of a common but also of a proper cause, in asmuch as by its light and motion is constituted the spirit which immediatly forms Animals and gives them life, which answers by way of proportion to that Spirit by which Seeds are made Fruitful, and the Child is formed. Which Spirit, although it hath its vitality from the eminent life of Heaven; yet that it may produce this or that life, it hath from Heaven, as it is Heaven, but as it is received in a determinate matter with a a determinate measure, suitable to the determinate sorts of living Things.*

But these things are said, not proved, nor do they make appear that the Heaven lives, and that such a vital Spirit is sent from the Heaven into these lower Bodies. And if this same spirit be the immediate Cause, what needs a determinate matter? Which being necessary, we should therein rather seek the Cause of Spontaneous living Things. But the Heaven can be only a common Cause, as it is in those things which are generated of Seed: and because it hath only one uniform faculty, it is no more disposed to breed a Flie, then a Wasp, or Flea, and therefore it cannot be the proper cause whereof we treat in this place.

The efficient Cause of Spontaneous live things lies hid in the matter.

Others therefore, seeing it was in Vain to search out of the matter for the efficient Cause of such live Things, they have sought the same in the matter and that rightly. Nor could that move them, of which we spake *in the foregoing Discourse,* that some conceive that the form and matter are internal causes, the efficient and the end external. For it is false, that the efficient Cause should be alwaies reckoned amongst external causes; but the form it self, as *Aristotle* testifies, is many times one and the same with the efficient. But some have sought this Cause one way, some another.

whether putrefaction be the Cause?

The most do hold putrefaction alone to be the cause of the Generation of Spontaneous live Things. And with what Authorities they endeavor to prove this their Opinion, I regard not, in case I prove it to be False. Which by this only Reason may be proved, in that the whole Nature of putrefaction consists herein, that it is the corruption of a mixt Body, consider'd as such. And if any thing else proceed from putrefaction, it is by accident. Moreover, experience shews that many Plants and other things are generated of their own accord without putrefaction. And of worms sundry flying insects are bred without putrefaction. And in *Cyprus* in the Brass Fornaces *Pyraustæ* or Fire-flies are bred without putrefaction. And therefore we must hold concerning other living Things, that they are not bred of putrefied matter, although somtimes in a putrid thing, and out of the part thereof which putrifies

Or from Concoction

Others seeing that putrefaction could not be the Cause of these Creatures held that concoction was the Cause. But in good truth, Coction is only an alteration and perfection of the Temperament, and induces no change save in qualities, and therefore of it self can produce no substance, but tends only to perfect a thing already constituted by its form. Or if any Coction precede the Spontaneous Generation, it it only a Previous disposition of the matter, which being attained, the Latent form begins to rouse it self, and begins to form its own body. And although *Aristotle 5. de Histor. Animal. Cap. 19.* writes, that it is common to all Worms, and such Animals as spring from Worms, to receive the beginning of their Generation from the Sun or Spirit; yet that is not to be understood of the communication of the Soul, but only of the disposition of the matter to receive the form under the notion of a Soul, which is caused by heat.

Some

Some again, not being likewise able to find a sufficient cause of this kind of Generation in putrefaction do again fly to the power of the Heaven, and write; that this Generation is made out of putrefaction, by force of the Heaven and Stars exciting the putrid heat, and directing that which is unnatural to the Garkass to become Natural and a certain primary efficient, to induce the forms of some peculiar Animals out of the subject matter. But this will not help a bad Cause. For in the first place, not the heat of the Stars only, but any other heat will serve to raise putrefaction in plants and Animals. Moreover 'tis a begging of the Question to affirm that forms are drawn out of the power of the matter. Moreover they must shew, how heat which is a quality can act beyond its abilities, and not only as an Instrument of a more noble agent, but as the chief efficient, produce a substance, and that such an one as the Soul of an Animal. *whether from putrefaction and the Heaven?*

Chap. 2. *The true Opinion concerning the Spontaneous Original and Efficient Cause of these Living Things.*

SInce therefore the Generation of Spontaneous living Things cannot proceed from the Causes hitherto specified (concerning which thing *Licetus* treates largely and laboriously in his whole 1 Book *de Spon. Vivent. Ortu.*) another cause must be sought after. For the right finding whereof, we must first enquire what is the difference betwixt the Generation of living things which breed of their own accord and of such as arise from Seed, and what living Things are properly said to be Spontaneous. And we must know in General, that those things are said to be generated Spontaneously, which are generated without any evident and manifest cause. So *Hippocrates* in the 1 Book of Aphorismes, Aphorisme 2. calls those fluxes of the Belly and vomiting Spontaneous, which happen without the use of Medicaments, and *Lib.* 2. *Aphoris.* 5. he calls those wearinesses Spontaneous, which proceed not from motions and exercises, but from some hidden fault of Humors. So also Plants which grow without the care and labor of the Husbandman are cal'd Spontaneous. Of which *Virgil* in his 2 Book of his Husbandry.

Nature on Trees doth different Births bestow;
Some of themselves without Mans aide do grow,
And round the fields, and crooked Rivers come,
As Limber Osiers, Poplars, tender Broom,
And Grey-leav'd Willows.

And Animals which spring from Copulation of their Parents are not cal'd Spontaneous; but such as are generated without the help of Parents are cal'd Spontaneous. Thus *Pliny Lib.* 9. *Cap.* 51. writes of Frogs: *'Tis wonderful how after six months life they turn to slime, no man discerning; and again in the Spring they are regenerated after the same secret manner, and this happens every year. Also Limpins and Scallops do breed of their own accord in sandy places.* But yet from the premises it is not sufficiently apparent, what those living Things are which be said to spring of their own accord. For although many plants grow without the Care and Labor of Men: yet they do not all grow without Seed; since many sow themselves, and cast their Seeds into the Earth, or Propagate themselves by Roots. We are therefore now to enquire the difference betwixt things that are generated of their own accord and such as are not.

Fortunius Licetus, Lib. 2. *de Spont. Vivent. Ortu, Cap.* 2. holds, that the Spontaneous Original of living Things proceeds from an Occult Principle which lies hid in the matter wherein the Generation is to be made, and therefore from a principle internal to the thing generated, though Latent. But the Spontaneous original of things is not thus sufficiently differenced from the non-Spontaneous; since also in the non-Spontaneous original of living-Things the hidden principle of the thing to be generated lies lurking in the matter or Seed. For the principle of generation is equally hidden to the sense, in an head of Garlick, an Onion, or a Corn of Wheat, as in Horse-Dung, whence the beetle arises. This rather ought, I conceive, to be *The opinion of Fortunius Licetus.*

The true difference. accounted the difference: that such things as are not Spontaneously generated do proceed from a Seed, or Bulb, or some other thing answering to Seed, manifestly produced by a plant of the same kind: but such living things as Spring of their own accord are produced without a manifest generator of the same sort. Truly when generation it self is made, or rather the formation of an organical Body, the generation of a Spontaneous living Thing differs not from that of a non-Spontaneous. For in both the motion and the formation of the Body is made by an agent, which lies concealed in the matter. But herein they differ, in that, before the parts begin to be formed, the Soul in its essence, and as such, and as it performs the office of a Soul, is in the Seed or matter in the non-Spontaneous generation: but in Spontaneous generation, although the Soul be in some sort in the matter of which the living thing is made; yet the Body of a Carkass, or what ever other matter, doth not participate the same under the notion of a Soul; because a Carkass is not properly animated, nor yet under the notion of an efficient cause, because as yet it is dul and Stirs not.

The differences of Spontaneous living Things. Howbeit, in this thing, there is stil no small difference. For some things are really engendred of matter specifically different; as the Beetle of Horse-dung, worms of Cheese or flesh; but some things seem only to the sense to be generated without seed, and of a thing specifically different, when as indeed they are made of seed, or of somwhat answering to Seed: as some Plants are said to grow of their own accord, after Rains or Inundations of Water, when as in truth they are made of Seeds mingled with Rains or Waters. So of Swines dung, Carduus, and Sow-Thistle and other Plants do grow, not as Beetles do out of Horse-Dung, or Worms out of Cheese, but because some of the Seed of these plants unchanged by digestion are voided afterwards with the Dung. Which two differences of Spontaneous Generation must needs be observed.

Places of Aristotle where he teaches that all things are Generated by an univocal Agent. And though there be some difference of Spontaneously Generated live Things: yet they all proceed from an univocal agent and not from an Equivocal: which *Aristotle* teaches in many places (nine of which *Fortunius Licetus* quotes) in al which he tels us, that all substances are generated by an efficient actually of the same Nature univocal. The First is, 1 *de Generat. et Cor. Text* 30. The Second, 1 *Magnor. Moral Cap.* 10. The Third, 1 *de Part. Animal. Cap.* 1. The Fourth, 7 *Metaphysic. Text* 22. The Fifth, *in the same Book, Text* 30. The Sixth, *in the same Book Text* 31. The Seventh, *in the same Book, Text* 32. The Eighth, *in the* 12. *Metaphys. Cap.* 13. The Ninth, *in the same place, Text* 18. all which may be seen in his works. We shall only produce one or two. For *Aristotle* in 1 *de Generat. & corrupt. Text* 30. 1 *Magnorum Moralium, Cap.* 10. 1 *de Part. Animal. Cap.* 1. writes, that even those things which are said to breed of their own accord have a like efficient cause preceding, as well as things produced by Art. And *in the* 7. *Metaphys. Text* 22. and *Text* 32. he writes expresly, that it is proper to a substance for to have necessarily another like substance actually preexisting, whereby it may be Generated. And *in the* 12 *Metaphys. Text* 13. and *Text* 18. he therefore rejects the Platonical Ideas, because all things both Natural and artificial have like univocal causes by which they are produced.

How spontaneous living Things are generated by an univocal generator. Although therefore it is to be granted, that even the Spontaneous Generation of living Creatures is after a sort univocal; Yet I shall not deny that Generation is an Analogical kind; and that Univocal Generation is more evident in non-Spontaneous, then in Spontaneous living things. Which *Aristotle* himself seems to hint, who in the place but now alleadge, 7 *Metaphys. Text* 30. saies that all things are made after a sort by an Univocal agent. And indeed the Nature of the Generation of Plants which proceed from Seed properly so called, (such as that is of non Spontaneous live Things, as also of those things which arise from a latent seed) is different from that of those live things which are most properly said to arise Spontaneously and Equivocally. For in the former, the Seed of which they are Generated, *viz.* Herbs, hath actually a Soul in it already: but in these latter, the matter of which the living thing is Generated hath not actually in it the Soul of the thing generated; suppose a worm. Yet the form lying hid in the matter is apt to be turned into a Soul, so as to communicate it self to the matter, in notion of a Soul, and thereout to frame a living Body. Whence that difference betwixt *Seneca, Scaliger*, and *Licetus*, concerning the Seed, may easily be compounded. For

Seneca

Seneca 3. *de Beneficiis Ch.* 29. and *Scaliger* in *Theophrast. de Plantis Lib.* 1. *Ch.* 5. teach that al things have their Seeds. But *Licetus, de Spont. Vivent. Ortu, Lib.* 4. *Cap.* 2. denies that al things have their Seeds, and holds that some things are propagated by no Seed properly so called, though they have somwhat answering to seed by way of proportion. For an answer may be made out of the very words of *Licetus*; *viz.* Seed is taken properly, and improperly. Seed properly so called is a Body, which as the proper subject contains in it self a Soul, in the first formal act; which comes to pass in such things as are not generated of their own accord: but improperly that may be called a Seed, or at least somwhat answering to a Seed, which hath not indeed a Soul actually, yet containes a principle or form, which attaining a fit disposition of matter begins to exercise the Office of a Soul. Whence, the Carkasses of Plants and Animals out of which Worms are Generated do not contain in them the Seed of Worms, yet they have in them a form, which doth afterward advance it self into a Soul. Mean while this also is true, that such things are not altogether Equivocally Generated as is vulgarly imagined: which appears even hereby, that those living things which are thought to be generated of themselves and Equivocally, are of the same sort with those which are not so Generated: which thing is manfest from Generation it self. For although some things Spontaneously bred do not generate, as Toad-stools, and Vine-Worms, and other vile creepers: yet most of them engender a living Thing like themselves, as Experience testifies. *Theophrastus* writes 1. *de Caus. Plant. Ch.* 1. and 5. and *Scaliger* upon him, that a Plant Sprung of its own accord hath by its Seed produced another like it self. So *Laserpitium* which grew up naturally of its own accord, and a whole Wood of Trees, where never were any before, did produce Plants that bare Seed. Bees bred out of a Bul are fruitful. And *Avicen*, 15. *de Animal. Cap.* 1. doth testifie, that he had a friend who made Scorpions, either by burying the Juyce of Basil, or by some other means, and they afterward generated other Scorpions. And that in a certain City of the *Saracens*, called *Scealikam*, after a great Rain, Silk-Worms were seen to cover the ground many miles together, and every Worm made Silk, and afterwards they flew away and made Seed.

Seed taken properly & improperly

Now that the univocal Agent by which Spontaneous living Things are bred is a Soul of the same sort with that whereby they are constituted in their being, and vivified, *Fortunius Licetus teaches Lib.* 2. *de Spont. Vivent. Ortu, Cap.* 26. For since, as *Aristotle* both in other places and in 1 *Magn. Moral. Cap.* 10 teaches, Plants and Animals arise from Seed as an univocal principle, but the Seed is not univocal to the Animal or Plant to be generated, save as it participates a Soul of the same sort; it seems from thence apparent, that the Univocal efficient from whence Animals have their original which are Spontaneously generated, is a Soul of the same Nature with that wherewith they are enlivened. And questionless the case is plain. For since it is most Natural and proper to the Soul to generate live things; nothing can Naturally procreate living Things which hath not a Soul in it.

The efficient of spontaneous live Things is the Soul.

Now that the Soul of these living Creatures is in the matter, and that we are not to seek their efficient Cause out of their matter, the Generation of Worms out of Flesh doth shew, in which no external Cause helping, unless the heat of the Ambient Air, Worms break out of the Flesh of their own accord.

Now whence this Soul which is the efficient Cause of these Spontaneous Animals doth come into the matter, of which they arise, is further to be enquired into. And although this be a very difficult point, and one of the obscurest in Nature, and it is also hazardous for a man to propound his opinion herein: yet will I freely propound my mind, which if it shall not please all men, yet such as are studious of the truth will acknowledg thus much, that it comes nearer the truth then that Opinion of the Eduction of forms out of the power of the matter, which is an Opinon that paies a man with words, but hath nothing in it to satisfie a studious mind, as is sufficiently declared in the 4. *Chap. of the foregoing Discourse.* And first of all we must hold (which I conceive to be out of question) that nothing can contribute such a matter nor consequently the Soul, unless it be a Living thing, or proceed from a living Thing; and that therefore Spontaneous living Things do only proceed from living Things or such as have lived: which also experience teaches. For it was never yet known, that of the simple Elements, of Metals, Minerals, Jewels, as such, any

whence the soul comes which Causes Spontaneous Generation?

Spontaneous live Things grow only out of Things living.

any Animal or living Thing hath been bred, but every thing of which such Animals are Generated is either a living Body, hath lived, or hath proceeded from a living Body.

How many waies the Soul may be in the matter?

Now to find out the manner of this generation, in the first place we must enquire, how many waies the Soul may be in a thing. For in the first place, which no man denies, there is a twofold act of the Soul: one Essential, called the first Act, and is the bare Essence of the Soul: the other accidental, which is called the Second, and is the operation proceeding from the Soul. And therefore the participation of the Soul is also twofold, the first is the Participation of the simple substance of the Soul, as of a form perfecting its matter; the Second is the Participation of the Soul operating. The Second participation is when Organs are provided for the performance of the actions; to the first there needs only a disposition of the matter, that the Soul may thereby be fit to perform the Office of an Efficient Cause and to form the Body.

A twofold act of the soul.

Essential

Accidental

A double operation of the soul.

A soul may be in a matter & not inform it.

But besides these two manners, there is yet a Third, and the Soul may yet after another manner be in some kind of matter, so as neither to inform the same and vivifie it, nor to perform the proper operations of such a living Thing. So the Seeds of Plants and Animals may be in the Water and in the Earth, and the Soul may be in them, and yet they neither inform nor Vivifie the Water nor the Earth. Hence *Aristotle* said, not without reason, 3. *de Gen. Animal. Cap.* 11. that all things are ful of Souls, while he thus writes: *Now Animals and Plants are bred in the Earth and Water, because there is moisture in the Earth, Spirit in the Water, Animal Heat in the Universe, so that all things are in some sort ful of Souls. And therefore they come speedily to a Consistence, when that heat is comprehended or received.* Which very thing manifestly appears from things putrid, out of which sundry kinds of Worms are every where bred, and in Plants which grow in Common Fields and Gardens where no Seed hath been cast. And scarce any place is so barren but that Plants and Animals will breed therein of their own accord. Now this speech of *Aristotle* is thus to be understood, not that all things do live and are animated; for which cause he did not simply say, that all things are ful of Souls, but in some sort, *viz.* in all things in a manner there is such a like substance, which when all impediments being removed it hath got a fitting matter, it rouses it self and performs the Office of a Soul. For, to live, is not to have and contain a Soul after any fashion; but to participate the same and to be informed by it, and as that which frames and preserves the organical Body. For, as *Aristotle* teaches, Animal heat, and consequently that which hath the Soul adjoyned thereto, is truly in all the lower part of the world, the Air, Water and Earth: but not as their essential part or attribute; since the Earth and Water are of their own Nature cold, and neither of them are informed by any Soul: but as a thing placed in a place or Vessel, *viz.* because the Earth, Water and Air, do contain the Carkasses parts and Excrements of Living Things, in which are Atomes and smal Bodies having Souls in them. And so the Generation of things Spontaneous is then caused, when the Souls (as *Fort. Licetus* speaks) are now by the benefit of heat united and associated to such things in which they were contained only as in a place or Vessel, under the notion of a Cause efficient, forming an organical Body; or as *Aristotle* speaks, when the matter shall comprehend that same heat of Animals and the Soul with it, and shall make it proper to it self; presently by way of Spontaneous Generation that matter receives the Consistency of a living Nature, putting on the Soul in Nature of a Form, which before it contained distinct from its Nature, like a Vessel.

How all things are ful of souls.

What 'tis to live.

The soul is two waies in the matter

Concerning which thing *Fort. Licetus* treats at large, *Lib.* 2. *de Spont. Vivent. Ortu, Cap.* 11. 28. *et Seq.* and endeavors with much labor to prove, that the form and Soul is two waies in the matter, *viz.* as an act and perfection in its proper subject, and then as a thing contained in a Vessel, not belonging at al thereto, or as an accident in the subject. And this distinction is the foundation of his whole Doctrine of the original of these kind of Creatures. 'Tis not worth while to cite here all that he there alleadges. For sure it is, the Fire with its form is in the Iron, is in the hot Water, is in Rain, is in the Earth, and yet doth not inform them. And which is a most clear example, Gold resolved into its smalleſt Atomes is in *Aqua Regia*, and Silver in *Aqua Fortis*; yet so as to retain their forms entire, as appears by their Reduction;

Reduction; yet they do not inform those Waters, but the Form of Gold and Silver is in the Waters, as in a place. The same appears in the Souls of living Things. For the Seed cast into the Earth is therein as in a place, nor is the Earth informed by the form of the Seed. Yea and which is much more wonderful, the Form of a Plant will sometimes remain in dry Wood, as *Virgil* writes of the Wood of an Olive-Tree, in the Second of his Husbandry.

And (Wondrous to be told) an Olive Tree
Out from a dry cut drunk oft springs we See.

Of which we shal speak more at large in *Chap.* 7.

But whether Souls may properly be said to be in a place, and whether all the Souls of Spontaneous Creatures are thus in the things whence they spring, I doubt. Truly if Seed, or a Body answering to Seed consisting of matter and form, may be said to be in a place, as Frogs spawn, or that Seminal Body out of which after Raine Plants do Spring, it is rightly said to be in a place. But whether the Soul it self which is therein, in the Water, or Rain, may properly be said to be in a place, I doubt. But let us thus take the Soul with its proper subject, and let it in this manner be said to be in a place: yet whether after the same manner in a Pine, out of which Ear-wigs, or in other woods whence worms spring, or in Corn whence the Wibbles are Generated, that Soul of the living Creature be present, may be justly doubted. For the Atomes of Gold and Silver consisting of their matter and Form, are in the *Aqua Regia* or *Aqua Fortis*, as in a place: and the Seed of some Plant or Frog, consisting of a Soul and matter, wherein the Soul is as in its proper subject, may be in the Earth or Water, as in a Vessel or place, but by means of the matter or Body wherein it is. But when of Wood or Flesh a live Animal is bred, there the Soul which of it self is in no place, hath no matter wherein it may be as its own proper subject, and in respect of which it may be said to be, in Wood or Flesh, as in a place or Vessel; but the proper subject of that Soul is that same thing or Flesh, wherein nevertheless it is not formally, but only really, nor hath the notion of a Soul, but then begins to be formally, and to be separated from the Wood and Flesh, and to live and exist by it self, and to have the notion of a Soul, and to exercise living operations, when through putrefaction or rather the heat joyned to the putrefaction, that matter is so elaborated that it may become a fit subject wherein the Soul may formally exist.

Spontaneous Generation how manifold?

And therfore as was said before, there is not only one way of Generation of Plants and Animals which are Generated of their own accord. For some are indeed Generated from Seed bred by a living Creature of the same kind, although they seem to be Generated of their own accord. So, after overflowings of water, after Rains and Winds, Plants do sometimes spring of themselves, of Swines dung Thistles and Sow-Thistles are bred. In which there is no other difference betwixt the Spontaneous and non Spontaneous, save that in the former the Seed lies hidden, in the latter it is manifest. And there are Seeds of different Nature. For some unless they be diligently lookt to and manured they lose their Seminal faculty and their Soul. Others although they seem corrupted, yet in a certain Juyce or in some Atomes the Seminal faculty is preserved. Again there are other Spontaneous live Things which are bred without Seed, as when of Cheese, Flesh or Wood, Worms are bred, in which there is no such Seed found as is in the Waters and in the Earth.

The opinion of Fort. Licetus *of the original of spontaneous live things properly so called.*

Now concerning the original of the latter kind, the question is very difficult, wherein to determine any thing is very liable to blame. *Fortunius Licetus*, *Lib.* 2. *de Spont. Viven. Ortu*, *Cap.* 36. holds that the efficient Generating Cause of Spontaneous Animal, is a Soul of the same Nature with that whereby such Animals are constituted in their being, but not quickening nor any waies actuating the subject wherein it is, but lying concealed, as in a vessel, in that Carkass out of which these Animals are Generated: and that the Soul which is in the Carkass is the same with that which did constitute the Animal or other living thing, but impaired, not having the notion of an actuating form, and perfecting that wherein it is, but of privation; since such an impairing deprives the Soul of its Ancient perfection, which was to quicken and perfect its subject Body. For as a sensitive and seeing Soul is an habit in an Animal that is found; but in one that is blind, it being evervated by the marring of the Organ it degenerates into Privation: so also he holds that after

Death,

Death the Soul of an Animal which remains in the Carkass degenerates into Privation, and being weakned it Creates Spontaneous imperfect Animals.

Now how the Soul is cast down from that perfection, he teaches *in the same Book Cap.* 37. and sets down two waies, by which the matter of the Carkass obtains a non-Quickening Soul. The first is; that when the Live-Creature dies, all the heat necessary to life is not abolished, but so much of it remains as suffices to retain the Soul in the Body, as in a Vessel. In which case, he writes, that as it may happen frequently, that together with the weakning of the heat and Death of the living Thing, the substance of the vegetable and sentitive Soul supported by that heat may suffer an Essential Empairement, whereby it may come to degenerate into a more imperfect nature and a baser kind of Soul; so he conceives it may somtimes come to pass, that retaining its Ancient Essence it may put forth its weakned forces. The other manner he makes to be this: because, saith he, while the old living Creature dies, and while the Excrement is driven out of the Body of the living Creature, its Soul yet remaining may introduce a new Soul into the next matter lately bereft of the same Soul, with a smal heat in the first instant of Nature, not yet able to vivifie its subject Body, but may be bred therein as in a Vessel, somtimes of the very same sort with the generating Soul; but most frequently imperfecter and Baser: both because of the imperfection of the matter, which cannot receive so perfect a Soul, as also by Reason of the Infirmity and Debility of the forces of the Soul Generating, which in the Death of the former Animal either perishes, or is very much weakned, that it cannot engender one like it self, but is able to produce one inferior to it self. Of which he treates at large to the 39. *Chapter*; wherein at last he concludes his Opinion in these words: the immediate efficient Cause of the original of Spontaneous living Things from which they immediately receive their Soul and all Spontaneous living Things are generated, is nothing else but a vegetable or sensitive Soul, abiding in the Carkass, or in the Excrement proceeding from living Creatures, as in a Vessel, lying hid with a weak heat, not actuating the same, nor any waies perfecting it, somtimes of the same sort, or also Numerically the same with that which was formerly in those living things: yet many times of a different sort and a more base Nature, and imperfecter substance; into which with the decay of the Body and heat, the former Soul is degenerated: which Soul in the Carkass or Excrements, proceeding from the former living Creature not quickning its subject Body, it remains therein, not exercising the actions of life, not as a form in its subject, but as in a place, and in a vessel, as it were by necessity of the matter, or at last by the total vanishing of the heat whereby it is supported, it self perishing; or with the augmentation of the said heat and vigour acquired from the Warmth of the Ambient Air, communicating it self to its subject Body, as a form and quickning Soul, and performing the functions of life, as shaping of a Body and generating of a Spontaneous live thing.

the opinion of Licetus *examined.*

But in very good deed, it seems hard to hold, that the former Soul remains in the Carkass; and to affirm it in a man, is most absurd: whereas nevertheless worms are as well bred of the Carkass of a man, as of other Animals. Indeed, *Lib.* 2. *Cap.* 39. *Licetus* excepts the rational Soul, and writes that only the Senfitive and Vegetative Souls remain. But it is only affirmed and not proved, that there are three Souls in a Man, of which the Sensitive and Vegetative may remain after his Death. Yea and in Brutes that same degenerating of nobler forms unto less noble is absurd, and is propounded without Reason. Rather the Constitution of Body and various operations do shew, that Spontaneous Animals which are Generated out of dead Bodies do differ in kind and Form from those Creatures out of which they are bred. Nor doth he shew any Reason, why the Soul of the living Creature should degenerate into the Soul of this creeper rather then another: since we see that every Spontaneous Animal is not bred of every living thing, but certain Animals are bred of certain Bodies. Nor in a blind Man doth the seeing Soul degenerate into a Privation; but in the Eye, because of the disease thereof, Privation of sight is introduced; but the soul it self hath the same perfection it had before, and the disease being removed sees again; nor while a man is blind doth it perform other operations. Yea, and the Soul while it lives informs the blind Eye, although it cannot cause sight therein by reason of its disease. And if the soul should remain in the eye of a blind man, as it doth

in

in a Carkas, contributing nothing thereto, the Eye would be mortified and Sphacelated; but we see the contrary. And although it is true that some part of innate heat and Radical moisture remains in the Carkasses of Plants and Animals, which is not destroied save by Putrefaction and Rottenness which many times happens long after Death; yet that temper and heat of the living Thing doth not remain, and therefore neither can the specifick Soul of the living thing remain; seeing the death of an Animal and of a live Thing is the extinction of that Vital heat, and thereby Souls are separated from their Bodies, but the Soul doth no way suffer any essential impairment (for the Essence of forms is indivisible) whereby it can degenerate into a more imperfect Nature. And when a living Thing is Generated of the Excrements of Animals, it is not credible that the Soul remains in the Excrements; since in the living Body, the Soul was never in the Excrements.

The opinion of the Author concerning the original of Spontaneous Live things properly so called.

But to me it seems more agreeable to truth, that in living Things there are divers Auxiliary and subordinate forms, yet so that one is principal and Queen, which informs the living Creature, and from which the living thing hath its Name, *viz.* The Soul it self of every living Thing; and the rest are Servants as it were, which as long as that superior and Lady Soul is present, do pertain to the disposition and condition of the matter, and therefore they do after a sort inform the said matter, that it may be a fit subject for the specifick form, and they have also actions of their own; yet they do not animate the same, nor do they give it the Name of a living thing; which is the Office of a specifick Soul only. Nor let any man hatefully traduce this Doctrine of subordinate forms as new. Most learned men have delivered the same, and have taught that these forms do constitute the Seminal matter as it were of live Things. *Jul. Cæs. Scalig. Exercit.* 59. *Sect.* 2. writes: *As in the Earth Plants are changed one into another; so above ground they breed Animals out of themselves. And that not out of putrefaction, but cherishing in themselves certain Seeds for Generation.* The same *Scaliger*, *Exercitation*, 190. *Animals* (Saies he,) *Are not bred of putrid Plants, but are the Of-spring of Remaining Vigor which is in them. For it is certain that beans are not putrified, when Animals breed in them.* He also *Lib.* 2. *de Plantis*, *p.* 389. rightly teaches, that it is manifest that Fir-Wood and straw or Chaf have in them the Natural rudiments of Wig-Lice. Also he writes *in the same place*, that it is commonly reported, that of Wig-Lice broken Wig-Lice do also engender. Which he counts unlikely. But that from the same original whence those that are broken did arise, new ones are Generated in the same place. But I see no cause why those rudiments of the Wig-Lice may not remain in those that are rubbed in pieces. *Shegkius* the German, *Aristotle, de Occultis Med. Facult. Lib.* 2. *Cap.* 1. *Page* 103. *in my Edition*, saies, it will be no absurdity, if we shall say that divers forms are in one substance. And afterwards, he proves in Plants, that the specifical form being abolished, there remains not only the temperament, but also the substantial form, and that it is the Author of Occult Faculties. *Zabarella* also, *Lib. de Generat. and Interitu*, *Cap.* 4. writes, that the form of a mixt Body in a living Creature doth not perform the Office of a form, in respect of the whole living Creature, but rather of Matter. But that the Soul being taken away, the same Form of mixture begins to perform the Office of a Form, and to constitute that Body specifically. And this he declares in the same place by an example. Just as, (saith he) if when a King is dead some Servant be made King, he was also before during the Kings Life, but he was not as King; and therefore if any shal ask whether a new King be created or no, answer ought doubtless to be made, that a new King is created, and the King is changed. Even so, at the Death of a living Creature, a new Form is acquired inasmuch as that which was before as a Condition of the matter, being subject to a more noble Form, doth now begin to be a Form to constitute the compound, and to bear Rule. And that which *Zabarella* speaks only of the forms of mixt bodies, that is to be understood of all Forms excepting the Elements, which are necessary to the Constitution of a living Body. And that there are such Forms, is proved before in the *Second Discourse* of this work. Nor doth it import any absurdity, that besides the specifical Forms there should be other subordinate Forms: but as *Zabarella*, *Lib.* 1. *de Generat. & Interit. Cap.* 2. writes, if it be not against Reason there should be two, neither is it that there should be four or an hundred together in the same subject.

There are subordinate souls.

There

whether the subordinate forms are specifical.

There is one who argues here, that subordinate Forms are also specifical. But either he understands not what a specifical Form is, or he cavils Maliciously; and in the mean time he grants in the same living thing divers forms. Verily, There is no form, which by it self considered may not be termed specifical. So the form of fire, where ever fire is, is specifical: but when Fire is in a man, it is not the specifick form of a Man, but the rational Soul is mans specifick Form. He Fights therefore with shadows, and Toies with cavillations, who denies subordinate Forms, and thinks they are not to be distinguished from specifick forms, because they also are specifick. The Form (saith he) of the Earth is under the command of a specifick Form, yet it is in its proper matter, and retains the Nature of a specifick Form, although it be under another Specifick Form. For it is not the Specifick form of that thing to the Form whereof it is subject, but of that matter whose Form it is, with which it abides, comes and goes. But if the form of the Earth be subject to another Form, why shall I not term the same (with *Zabarella*) a subordinate Form? But in a Man to hold both the Form of Earth, and the Humane Form to be specifical, is most absurd. For there is no Natural thing which hath two specifick Forms. Yet those specifick Forms which whiles they are in the living Thing do belong to the matter, the specifical form departing, do become specifical, as the same *Zabarella* teaches, and perform the operations of a specifical Form. So that Form from whence there arises out of a Carkass a Beetle, a Wasp, a Bee, while it is in the Horse, or other living Animal, it cannot be called the form of a Wasp, a Beetle or a Bee; since then it performs not the Office of a Form, but is in place of matter. But when it performs the Office of a Form, it can then multiply it self, and beget its like. And indeed the Nature of a Form is far different when it is subordinate and in the place of matter, from what it is when it becomes specifical. Therefore also subordinate Forms do not give a Name to their subject, nor can I say that in a man there are Worms, in an Heyfer fed with Mulberry Leaves there are Silk-Worms, but at last when the Specifical Form departs, they begin to perform the Office of a specifick Form, and give a Name to the thing.

Whence also that is of no moment which some Object, if the Soul of a Worm were in a Plant, the same substance would be a Plant and an Animal; since the Form gives as well the Name as being to a thing. For the species or Forms of Things, truly, are not simply known or defined by us according to their Essence, but so far forth, as being sensibly parts of the World, by their Bodies and actions they fall under our sense; and a Name is given them, not from their essential act, but from their faculties and actions which they exercise in such a subject. For indeed, the Seed of a Dog doth not essentially differ from a Dog: yet because by the term Dog we do not understand simply the Soul of a Dog with any kind of matter, but a four footed barking Beast, the Form of a Dog in the Seed is not called a Dog, before it have shaped a Body fit for it self. After the same manner, in a Silk-Worm and Butter-Fly, there is one and the same Soul, yet is it not termed a Butter-Fly, til it is changed into a Winged Creature. So also, in a Plant, though there is the Soul of a Worm, yet the plant is not termed an Animal, but the Government of the Plants form ceasing, and another Soul receiving and exercising the Soveraignty, 'tis termed an Animal.

How subordinate forms are in things.

Nor can it be hence concluded (as some object and think it may) that there are in man and sundry other Animals Worms, or that this or that living Creature hath Worms or other live Things in it. For to the Constitution of such Animals, as of all other Natural Bodies, there is requisite not only a Form, but also a matter, and the Form ought to inform the said matter. But those Forms, though they are really in other living things, yet are they not therein in the Nature of forms, nor do they perform the Office of Forms, nor Animate the matter, nor quicken the Body, nor exercise the operations of life therein, but all these things are performed by the more noble and specifick Form, or Soul of the living Thing: but they themselves belong to the disposition and determination of the matter. But when that specifick and more noble Form or Soul goes away, they being stirred up by the ambient heat, and having gained a fit disposition are advanced into the quality of Forms, and communicate themseves to the Body as vivifying Souls, and in the first place they set themselves to shape Bodies fit for them, but afterwards they begin to exercise there-

therein the functions of Life. Yea and the same Forms do lie hid under different external Figures, and so pass into the Theatre of Nature. 'Tis a clear case in the Palmer Worms, in which one Soul puts on divers Bodies, and as *Aristotle* 5 *de Hist. Animal. Cap.* 19. and *Pliny, Lib.* 11. *Nat. Hist. Cap.* 22. saies, there is a various succession of Forms, *viz.* external ones. For the internal remains the same. Which though it may seem to some absurd: yet is it no waies absurd, but it is easie for any one to make observation of the truth thereof. For first of all, of the Egg of a kind of Butter-Fly is made a Palmer Worm; this Worm, according as *Libavius* diligently hath observed, *Singular. Part.* 2. *Bombycior. Lib.* 1. *Cap.* 21. in a months space changes its Skin four times. And who will say, that here the internal form is changed; unless he will say when Snakes cast their Skin that a new Generation is made. Afterwards, it becomes a Silk-worm; where again there is no essential mutation, for a Silk-Worm is no other then a Palmer Worm grown up. And when afterward it becomes a Nymph, there is again no essential mutation, but the internal form only working it becomes a Butter-Fly. Nor doth this happen only in the Palmer Worm and Silk-Worm, but in all Egg-bearers, as for example in the Chick of an Hen. For look as, while by the heat of a Bird of another kind, or also of the Fire, a Chick is hatched out of the Egg of an Hen, there cannot so much as any thing be imagined which should give the Soul to the Chick, unless it had been before in the Egg: so also when by the Warmth of Womens Dugs the Eggs of Silk-Worms are hatched, and there comes out Silk-Worms, nothing can be assigned which might generate the Soul. And that one Soul can assume various Bodies the degeneration also of Plants doth shew, whiles Rie and Barley do turn to Wheat, and Wheat again into Rye and Barley, the same internal Form remaining, and the external only changed.

One Internal form may put on divers external ones

Hitherto also belongs the degeneration of Plants into other Plants; which happens in those Plants whose Seeds are either ambiguous, and contain divers forms in them, yet so as that one Rules and the other serves; unless upon occasion another alteration be made; or whose Soul is disposed to receive divers forms external, as appears in Silk-Worms, yea and Bees too. For as the same essence of a Form doth in them remain under divers external shapes, and first there is a Palmer Worm, then a Silk-Worm, then a Butter-Fly: so also in Plants, there is the same transmutation of the external Form. Which also *Julius Cæsar Scaliger* doth grant; when in 1 *de Plantis*, (saith he) there are the confused principles of divers things in Seeds, as of Rapes, Cole-worts, and others. *Licetus* indeed *Lib.* 2. *Spont. Viv. Ort. Cap.* 14. writes, that a Form upon great mutations of the matter is changed into another species, and depressed into a more inferior degree. But this degeneration upon the mutation of the matter is made not only into an inferior degree but also into a Superior: which experience doth testifie. Wheat degenerates into Darnel; Water-Cresses into Mints; Rape into Radish; Basil into running Betony; the white Vine into the black, and the black into the white; Barley into Wheat, and again Wheat into Barley. If in *Hungaria* they sow German Rye it turns into Wheat. If a Field be somwhat barren, our White Oats (as they call them) degenerate into black; if the same Seed be sowed some years together, it grows more base. And therefore after some years the Husband-men are forced to change their Seed. Contrariwise, if black Oates be sowed in a fat Soil, white Oats will Spring up therfrom. Gilly-flowers, Roses, Violets, do oft change their Colours. Whence *Virgil* writes of Seeds.

The degeneration of Plants.

> *Choice Seeds and with much Labour culled out*
> *Do yet degenerate.*

And *Galen* writes of his Father, in 2. *de Ele. Facultatibus, Class.* 2. *Page* 30. that, when in his declining Age he was delighted with Husbandry he sometimes sowed Wheat and Barley, and pickt out al other kinds of Seeds that were mingled with them, that he might certainly know whether Cockle and wild Barley would proceed from the change of the said grains, or whether they had a proper Seed of their own. He therefore found among the Wheat frequent Darnel, and amongst the Barley wild Barley or wild Oates; and made the same experiment in other Seeds. He therefore found in Lentils also, that they were changed into hard and round

Vetches and Ax-wort, also Goos-grass grow therefrom. If some would now adaies use the like diligence, they should merit most worthy commendations. For so they would not so frequently become laughing stocks for Country Clowns. And this experience would tend more to the gaining of the knowledg of Natural Philosophy, then those Vain speculations, and more base then Ditch-Water, so much in request. I shall say more of the degeneration of Plants beneath. *Chap.* 7.

And so much may suffice to have said of the primary efficient cause of the Generation of Spontaneous live Things. Only this one thing is yet to be noted, that these degenerations are not properly Spontaneous Generations, since they are made of Seed and that evidently: although those Forms, according to the divers disposition of the matter, have the power to shape sundry figures of the external Body. Also the Ambient heat, especially that of the Sun and Moon, do concur to their Generation: but that heat is not the primary agent, but only stirs up the Soul which lies secretly hidden, and prepares and affords fitting matter to the same. And therefore that what we have said of the Spontaneous original of living things may be more apparent, we must speak yet somwhat concerning their matter.

Chap. 3. *Of the Matter of Spontaneous living Things.*

The matter of spontaneous live things.

And indeed the chiefest difference betwixt live Things of Spontaneous and non-Spontaneous original, is in their Matter. For both Animals and Plants which are not Spontaneous do so Spring out of their Seeds, that it is manifest to every one whence they proceed. But the principle of Spontaneous live things lies hidden, and so they arise of their own accord, as it were without any Generator. Yet they have also their principle. For every one of these is not bred of every matter, but such and such a sort of such and such a matter, as shall hereafter more particularly appear.

The various propagation of Plants.

And whereas we said before, that some things seem to be generated of their own accord, which yet are indeed generated out of a Seminal principle, by a living Creature of the same sort; others proceed from Bodies specifically different; we must know, that the Seminal principle is not in all things tied to the same matter; which also appears from Plants, which do not spring of their own accords. For all Plants do not proceed from Seeds peculiarly so called, but some are propagated without Seed by Roots, others by bulbes, others by branches pluckt from the whole, and others by Leaves pluckt off, as the Indian Fig-Tree. And therefore it is no wonder, if the Seminal principle may be preserved entire even in Waters, in Rains, yea and in the dung of Animals, as shall be hereafter more particularly expressed. Yea, and in more Ignoble Animals, the Seed is after the same manner preserved in the Earth and in the Water, as shall hereafter be declared. So that *Aristotle*, 3 *de Generat. Anim. Cap.* 11. said that al things were ful of Souls. For there is scarce any Body from which such Spontaneous Creatures do not arise.

Whether Animals Spring from Bodies imperfectly mixed.

Licetus indeed *Lib.* 2. *de Spont. Viv. Ort. Cap.* 13. holds that such living Things are not bred of Bodies imperfectly mixed: but that must be rightly explained. For sure it is that of Rains, Mists, Dew, sundry kinds of Worms are bred, and experience doth testifie the same. Which though they are imperfectly mixed bodies if they be considered in their own Nature, and in them some Element is predominant, as in Dew and Rain Water: yet among these Bodies other Bodies perfectly mixt are mingled in their smallest Atomes, in which as in Seeds there are the Souls of living Things, and out of which Worms are also Generated afterwards. And therefore Worms are not bred of every Rain, nor of every Dew, but of some only.

The Opinion of Licetus concerning the matter of Spontaneous live things.

Touching this immediate material cause of Spontaneous live Things, *Fortunius Licetus* treats, *Lib.* 2. *de Spont. Vivent. Ort. Cap.* 13, 14, 15, 16. the Sum whereof is this. He saies the Spontaneous and non-Spontaneous Generation of live Things do herein agree, that each is made of a perfectly mixt Body being very near of a temperate complexion, having in it self the last disposition and immediate aptitude to receive a Soul for its Form; and that the preceding disposition or that same privation both in the non-Spontaneous and the Spontaneous generation is nothing else

but

but a temperament just under the degree of the Soul, not having the Soul any waies adjoyned thereto, and that it is a certain degree of heat. But that the difference is herein, that the non-Spontaneous Generation of a living thing is caused by an external agent, first preparing the matter for it self by previous alteration, and afterward when it is prepared, by way of Generation furnishing the same with a Soul: but contrariwise, the Spontaneous Generation of living things is caused by an agent lurking within the matter, prepared by virtue of the Ambient Aire. And that consequently the disposition of the matter subservient to the Spontaneous Original of living things is nothing else but Coction by the Ambient Heat. Moreover he laies down two attributes of the immediate matter of Spontaneous live Things. The first is, that no Animal can be Spontaneously generated, save of a matter which was also before in some sort living, and Animated, either in the rank of Plants or of Animals, whether it be the part of a living Thing, or the Fruit, or the Excrement, or somwhat else belonging thereto; which nevertheless hath not now its Soul any longer as a form, but contains it as a Vessel, forasmuch as it belongs not to the essence of the Carkass wherein it is contained. Another is, that it must be immediately collected and prepared by the heat of the Ambient Aire, that it may put on the Soul and Nature of a living Creature, either of the same sort with the former, or of another sort. For when the matter hath comprehended a natural heat and made it its own, presently it attains a living Nature, and puts on a Soul under the notion of a Form, which before it contained only as a Vessel, being distinct from its Nature.

The opinion of Licetus *examined.*

But in good truth, this Opinion needs a convenient Explication and Limitation. For in the first place, we must needs here repeat what we said before, that there is not one manner of Generation of Spontaneous living Things, but some proceed from a concealed seed of the same kind, as when of a secret Seed a Plant is Generated after Rain, even out of Stones; and others do Spring from dead Carkasses. And therefore, the first attribute of the matter of Spontaneous live Things, *viz.* that it is a Carkass, wherein there is a Soul as in a Vessel, not Animating, doth agree only to the second kind. But if, as he himself holds *Lib.* 3. *Cap.* 117. some powder or Juyce of a plant, having in it a Seminal principle, shal creep into the Chink of some Stone, being brought thither by Rain, there truly a Plant doth not grow out of a Carkass, but out of a Seed of the same sort. Which also happens out of the Dung and excrements of Animals, in which there is either undigested Seed, or some Seminal Juyce. For, as was said before, the Seminal principle is not in al Plants Seed peculiarly so called, which is Generated in a certain part of the Plant endued with a certain Form external, but in some it is diffused through the whole Plant, as in the Willow, and therefore a Willow may be generated by a bough pluckt off from the Tree and Planted in the ground. When therefore of such a Seed or such a Seminal Juyce a Plant is bred, either in the Earth, or in a Stone, or in another Tree, there the plant is not made of a Carkass, but of Seed. Moreover, this also wants explanation; when he writes, that the matter of which such a Generation is made must be very near temperate. For this indeed is true of the efficient cause. For neither a faint heat nor a burning heat can dispose the matter to receive a soul, but it ought to be moderate and of a digestive Nature. But I think it is not necessary, that the matter which is bred by that digestion should be temperate in all. For there is a great difference in respect of temper in the Bodies Generated. For worms are bred of Cole-worts, Wormwood, Pitch wood, Flesh, which have most different Temperaments.

The difference betwixt Spontaneous and non-spontaneous generation.

But as to the difference betwixt Spontaneous and non-Spontaneous Generation, true indeed it is, that in the non-Spontaneous Generation of living Things, or that which is caused by Seed, the matter is Elaborated by the Soul of the living Thing in the Body thereof, and is so prepared, that that which before was not (for neither is the Blood in Animals nor the Alimentary Juyce in Plants Animated) becomes a fit subject for a Soul, and the Soul communicates it self thereto, and then it is called Seed, out of which afterwards when it is cherished by the heat of the Womb or the Sun, or some other thing, and the Latent Soul stirred up, a living Creature of the same kind springs forth. But after this manner the first kind of Spontaneous live Things doth not differ in manner of their Generation from that lately declared. For since, as *Jul. Cæs. Scaliger* saies rightly, *Exercit.* 6. *Sect.* 10. a Tree or

Plant generates when it produces seed, but not when the Tree or Plant Springs up out of the Seed, but then the thing generated which was before imperfect becomes perfect. That Seminal princple, out of which either in the Water or in the Earth or out of Stones, Plants Spring without the culture of man, was Generated in Plants of the same kind, and did for a season lie hid in the Water, Earth, or Stone, til it obtained a fit matter whereof to frame it self a Body. And then if that production of a Plant shall be counted a generation, it is also performed by an internal principle. But in the other kind of Spontaneous living things, when Worms are bred of the Carkasses or Excrements of Plants, the Soul is also present in the Carkas, although not under the notion of a specifical Form, yet realy notwithstanding. But it cannot proceed into act, and exercise the Office of a Form and Soul, nor can it prepare a matter whereto to communicate it self, which is done in Plants and Animals, but there is need of the Heat either of the Ambient Air, or that which arises from putrefaction, that the matter may be fitly prepared and disposed; which when it hath obtained the said form begins to put it self forth, and to exercise the function of a Soul. Also the influx of the Heaven and especially of the Moon, doth not a little assist towards the introduction of such a disposition. For experience teaches that Wood which is cut a little before the new moon is not easily infested with Worms; contrariwise, such as is cut about the full-Moon is most subject to Worms. So out of mud which is dug up about the New-Moon to make furnaces and Hearths, Crickets are easily bred. Now the Bodies in which these Souls lie hid are either the Carkasses of Living things, or parts of the said Carkasses, or the fruits or Excrements of living Things, of which very things *Aristotle* 2 *de Generat. Animal. Cap.* 3. expresly writes, that they have a vital principle; and those Souls did pertain to the disposition of the matter which was the proper subject of that living thing. Hence it is, as *Aristotle* saies well, that every form requires its proper matter, that as the Souls of living things differ, so also those subordinate Forms which constitute the proper matter for every Soul must differ, and therefore every Animal is not bred of every Carkas, or of every part of a living or dead Body, or of every Excrement, but determinate Animals are bred of determinate matter. Of Flesh one kind of Worms and none else is bred; of Cheese Mites proper thereto and no other: of the Leaves of Herbs Palmer-Worms; of the Pine the *Bupestes* and Pityocampe, and no other Worms; of Horse dung a particular sort of Beetles; Long-worms bred in the Guts; Lice and Fleas in the soyl of the Skin; a certain kind of Worms and Beetles under the Shoes, of the filth of the Feet.

The matter of spontaneous live things

Fortunius Licetus indeed, *Lib.* 2. *de Spont. Vivent. Ortu, Cap.* 14. thinks otherwise in this point, (as also hath been said before) and is of opinion that the Soul which he conceives lies hid in the Carkas, as a thing placed in its place, is the same form which was before in the living Creature; and that it remains in the Carkas with some degree of heat, although it belongs not at all to the substance thereof, and that upon a great mutation of the matter it is changed into another sort, and thrust down into a lower degree. But this is a great supposition, that a soul should remain in the Carkas of an Animal after its Death; as also that these Forms should be changed into other species. Nor is it truly credible, that the soul of a Pitch-Tree, or a Pine-Tree should be changed into a worm, or the soul of an Horse into a Wasp. And when Worms are bred of the Excrements of Animals, Whence hath the soul its Original in such a case? Yet we grant, that the soul or seminal principle of such things as have been once generated of their own accord, their body being corrupted, may stick in some matter, and come to live again. So Flies and Frogs may melt in the mud, and of that corrupt matter in the spring time other Flies and Frogs may breed. But all these things shall be hereafter made more manifest, in our Particular Discourse of the Original of Spontaneous live Things, where we shall speake of all the sorts of them.

whether one Form is changed into another.

To conclude therefore this present subject, this I conceive may be most probably held concerning the matter of these kind of Creatures: (since there are two kinds of Spontaneous live Things, as was said before;) that in the former the Seminal matter, as the proper subject of the soul, is communicated from the Generator it self, and that so disposed, that it can retain the soul though it be divided never so smal.

The matter of spontaneous live things

Nor

Nor is this absurd; but that forms may be contained in the smallest Atomes and incomprehensible to the senses, even Metals do shew, which are dissolved into their smallest particles by *Aqua Fortis* and *Aqua Regia*, so as they may be strained through a paper, and yet nevertheless they retain their Essence entire in those smal particles, as by reduction doth appear. Whereof we have spoke at large in the *Third Discourse, Chap. 1. of this Work.* But in the other kind, as in dead Carkasses, the Soul hath that subject wherein it was in the living Body, while it was in place of an immediate matter to the superior Form. But as the Seeds of non-Spontaneous Live Things although they are cast into the ground do not alwaies put forth their inbred Virtue, but are corrupted, sometimes by cold, sometimes by heat, or through want of fit nutriment, and so come to die, or to rest a long time before they put themselves into action; (as many Seeds rest al the Winter in the ground, until by the heat of the Ambient Air they be cherished, and can draw fit nourishment out of the Earth:) so also in those things which are said to arise Spontaneously, the Seminal virtue rests, til it obtain a fit matter out of which to frame it self a Body, and be roused up by the heat of the Ambient Air, and cherished: whence it comes to pass, that Animals which arise of their own accord are not generated in the Winter, unless sometimes under Dung, where the cold cannot come, but in the Spring, Summer and Autumne, *viz.* When by the heat of the Ambient Air caused chiefly by the Sun and Moon, a fit matter is afforded, out of which the Latent Soul may frame it self a Body, and the Soul it self may be set on work. But sometimes this same Seminal Virtue doth quite perish and die. Nor would I have any Man carp at what I have hitherto said and shall hereafter say concerning Souls, and the Seminal Virtue in Atomes and smallest bodies, and charge me as if I held that such souls, because in so many mutations they remain entire, are immortal. For, as the seeds of non-Spontaneous Plants do many times remain long entire, and yet at last die: the same may also happen in the Spontaneous, *viz.* if they meet with some contrary, or the matter be too much divided. Concerning which thing *Francisc. Aguilonius, Lib. 5. de Optic. Propos.* 8. thus writes: although there is no smallest quantity, yet there is the smallest light Natural, that is, a light so weak and thin, that it cannot be made thinner without perishing. After which manner there are also the smallest parts of Natural Bodies; *viz.* which if they be further divided they lose their Form and Essence. And *Propos.* 15. And this Imbecillity of Subsistency is common not only to these qualities which admit the diversity of greater and lesser, but also to al Bodies which vary their magnitude. For as these without some bulk, so the other without some degree of excellency cannot preserve themselves from perishing. For their forces being further attenuated do perish and come to nothing, not destroied by any contrary, but only through want of measure, which is a necessary condition by the irrefragable law of Nature required for the proper maintenance of every one. For that which *Aguilonius* speaks here concerning qualities must also be understood of Forms from whence the qualities do flow.

Forms remain in Atomes.

The Seminal virtue sometimes dies.

Now one there is, who from this Doctrine indeavors to Calumniate me, as if I held that al the Forms of Beasts are separable, and may exsist in the first act, out of their matter, and that therefore they are immortal. For this never came into my mind, but I have held with all Philosophers, that no Form saving the Humane is separable from its matter, but doth perish therewith. Yet this we must hold, that al Forms are not of the same kind, but some so coupled to their Bodies and perfect, that the said Bodies perishing, they also perish, such as are the Forms of an Ox, a Lyon, a Goose, a Crow, and of other perfect Animals. Nor can it be that the Body of a Lyon, an Horse, a Goose, a Crow, being destroyed, the Souls of the said Animals should remain alive. But it is otherwise in plants, wherein the Soul may remain in the Root, Seed, branch, Leaf, yea and as shal be shewn hereafter, in the Juyce. And the same holds in Insects, whose Soul may be preserved in base matter unfurnished with Organs. Yet these Forms cannot exist any where, but though they are not in an Organical Body, yet they are in a proper matter, and indeed the very same which was their matter in an Organical Body. Much less are they immortal, but that matter perishing or being corrupted, they also are abolished, as was lately said.

The souls of Brute Beasts are not immortal.

CHAP.

Chap. 4. *Of the End of Spontaneous Live Things.*

Sundry opinions concerning the end of Spontaneous live-things.

THere remains yet one thing to be explained in General, *viz.* to what end Spontaneous living Things are Generated. For that such Things are not made by Chance or Fortune, was said before. But concerning the end of these things several men are of several minds. Some are of Opinion, that they are therefore generated, that putrid matter might be consumed, and the Air by that means purged. For since out of putrid Bodies many bad exhalations are lifted up, which defile the Air, whereby afterwards more perfect Animals are hurt and become diseased; to prevent this, and to provide for the health of men and other perfect Animals, they hold that Nature produces these petty Creatures, and spends the matter both in their Generation and nutrition. But in good deed, these petty Animals are neither generated of putrid matter as such, nor are they nourished therewith. For although they are made of matter which putrifies, yet are they not made thereof as it is putrid, but rather of the digested and better part thereof being Separated from the putrid. And therefore after the Generation of Worms and such like Animals, putrid matter remains, which pollutes the Air no less then it did before. Nor are these petty Animals which are Generated out of putrifying matter nourished by putrid matter, but seek their food upon other Creatures, as Plants and live Animals. Nor are those Countries or places where these Creatures are plentifully bred, more healthful, but for the most part more unhealthful then other places.

Others are of this Opinion, that as other created things, so these also are made for the sake of Man. But *Julius Cæsar Scaliger*, *Exercit.* 250. *Sect.* 1. doth justly laugh at them who say that Fleas were created for mans sake, to suck out his unprofitable Blood, or that Wig-Lice are sent by Nature to wake us out of our sleep in the nights, that we might pray to God. For are not Dogs also and other brutes ful of Fleas and Lice?

Others, as *Avicenna*, do hold that it is better that Lice should be bred, then that the putrid matter should so remain; and they acknowledg rare workmanship in the structure of such petty Animals. Others conceive such Animals were made for the perfection of the Universe, and that not only perfect Animals, but also such imperfect ones as these do make for the Pulchritude and Integrity thereof. Which *Scaliger* seems to have taught, who *in the place forecited* thus writes: Man for God, and the World is made for man. And *a little after*: Man is the Prince of Animals. Now man should not have been Prince, if he had not been such as he is; *viz.* in the middle. He could not be in the middle, save betwixt extreams. Extreams were therefore made, that he might be in the middest. They were therefore made for the sake of the middlemost. Now if any of the extreams, or of those which are betwixt the middle and the extreams were wanting, there would be a Vacuity or Empty space among the forms. Which would be a greater fault in Nature, then an empty space without a Body. For what is more absurd then a middle without extreams?

The true Opinion.

Which two last Opinions seem not much different, and are convenient enough, if rightly explained. For God the Work-Master of all things would every where discover his Wisdom and power, and therefore was rather willing that living Creatures should be multiplied in Nature, then corrupt and putrid matter; and that the Bodies of perfect Animals when they are corrupted should rather turn to Ignoble Animals, then meer putrid matter. Which kind of Animals are various, yet determinate, and every one according to their kind. For seeing, as *Aristotle* well writes, that as Souls differ one from another in Nobleness and baseness, so also the Nature of that Body wherein they are, and which is the proper subject of every Soul, doth differ: this difference must needs proced from some Form, which although in the living Body of perfect Animals it is instead of matter; yet afterward, the Soul departing, it rouses it self up, and performs that which is in its power to do. Hence, look how many sorts of perfect Bodies there are, so many sorts there are also of Animals arising from them; of which also *Austin*, *Lib.* 12. *de Civitate*

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Dei, Cap. 4. to count (saies he) the faults of Beasts, and Trees, and other mutable and mortal things, wanting either understanding, or Sense, or Life, to be damnable, is a ridiculous Thing: since those Creatures have by the will of the Creater received that manner of being, that by going and coming they might perfect the lowest Pulchritude of times, agreeable to the parts of this world, according to their kind. *And a little after*: the beauty of which order therefore delights us not, because in this condition of our mortality being interwoven therein we cannot discerne the whole, to which the particles which offend us are decently and aptly fitted. And *Again*: Nature considered in her self and not with reference to our commodity or discommodity Glorifies her Work-Master. For living Things make a nobler degree of Bodies, then things simply mixed. And *Aristotle* himself 1 *de Part. Animal. Cap.* 5. (which place also we cited before) acknowledges the Wisdom of the most good and great God, in such petty Animals, while he thus writeth: *With a Childish scornfulness to despise and be troubled at the disputation and consideration of the meaner sort of Animals, is an unworthy thing: since there is nothing in Nature which hath not some wonder in it. And that which* Heraclitus *is reported to have said to those who coming to speak with him, and because they found him sitting in a Bakers Shop Warming him at the Oven, they stept back and would not go to him; come in boldly quoth he, and be not ashamed, for the Immortal Gods are even in this place also. The same must be done in the searching out of the Nature of Animals. For we ought to attempt every thing, without any shame since the Divinity of Nature is in them all, and her comly and beautiful Artifice. For that is every where chiefly joyned to the works of Nature, where nothing is done rashly and by chance, but all to some end and purpose. Now the end for which any thing is, or was made, hath in it the Notion of goodness and Honesty. But if any man think the contemplation of other Animals to be Base and Vile, he must needs think the same of himself also, for we cannot behold without much loathing those things whereof the Body of man consists, as Blood, Flesh, Bones, Veins, and such like.* So far *Aristotle*. *Fortunius Licetus* indeed, *Lib.* 1. *de Spont. Vivent. Ort. Cap.* 11. opposes their Opinion who hold that such things are Generated for the perfection of the universe, with this reason chiefly, because the universe is before them in Nature, and furnished with its own perfection, which no Generation of Spontaneous things can encrease, and because it many times happens, that some sort of these Spontaneous Creatures is wanting in the world, and yet the world is not therefore imperfect. But although the universe were perfect before some such Spontaneous Animal was bred, and granting (whereas nevertheless if they are not in one place, they are commonly alwaies in another) that some sort of these Creatures is wanting in the world: yet the forms from whence they proced never have been nor never are wanting. And he himself grants, that Souls may lurke in other Bodies, as in a Vessel, so as neither to have the notion of an efficient, nor of a Soul.

The Glory of God shines in the smallest Creatures.

Chap 5. *The Sum of what hath been said concerning the* Spontaneous *Original of Living Things.*

AND that we may contract what hitherto hath been said concerning the Spontaneous Original of live Things, into a smal compass; Spontaneous live things are Generated, when either the Seed, or Seminal principle, and the Soul it self of live things, being somwhere secretly hidden, having obtained a fitting matter, and stirred up by the heat of some Ambient Body, doth put it self forth and begins to exercise vital operations: or when the Form which was necessary to the constitution of the subject of some more Noble living thing, the former Soul departing, becomes its own Master, and being excited by the Ambient heat or the heat of putrefaction, and having obtained a new disposition fit to exercise Vital actions, it rouzes it self, and becomes an actuating and Vivifying Form to the subject matter, and begins to exercise the actions of a living thing.

A brief of the opinion concerning the original of spontaneous live things.

From whence it is apparent, that all matter which is necessary to Spontaneous Generation, and which contains secretly in it self the Form and Cause of a new and Spontaneous Body, proceeds from living Things, and it is either Seed, or somwhat answering to Seed, either the whole Carkass or part of the Carkass of a living Thing,

Spontaneous live things spring only from live things.

Thing, or an excrement, or somwhat that some way proceeds from a live thing, and contains in it self a vital principle. For, as was said before, the Seed and Seminal principle, and that which answers to Seed, may long lie hid in Atomes, divers matters, powders, dry things, and in the Earth. Yea and the more Ignoble sort of Animals some of them, although they somtimes seem deprived of life, and to exercise no Second act of the Soul, as it happens in Flies, Frogs and some other Animals, which lie all Winter long as it were dead: yet the Soul lying hid even in vile matter doth vivifie the same, and being in the Spring cherished and awakened by the Ambient heat, it exercises vital actions by the Second act, and is then said to revive again. Moreover there is no living thing, out of whose Carkass Excrements, Urine, Sweat, Vapors, and steams going out of the Body, and filth gathered in the Skin and Garments sundry kinds of Worms are not produced; so that *Aristotle* said rightly, that all things were after a sort ful of Souls. Now the Soul which lies hid in such things as proceed from perfect Animals, and afterwards proceeds from them, is alwaies of an inferior degree and sort, but never of the same or an higher, unless they be some imperfect Animals, as was newly said of Flies and Frogs. For the same Soul cannot inform Bodies of divers sorts, nor cannot any thing act beyond its strength. And although as was also said before, *Fortunius Licetus, Lib.* 2. *Chap.* 17. teaches that the same Soul, or of the same sort and condition with the Soul of the former live thing, is in Spontaneous live things: yet that may not be allowed, for the cause aforesaid. And the Nature of Degeneration is far different from that of the Spontaneous Original of living Things. For in degeneration, as also in Silk-Worms and Butter-Flies, it may happen, that the same Soul may be in divers bodies, and so be naturally disposed to put on divers external Forms, as when Rye is turned into Wheat, and of the Egg is made a Palmer-worm, then a Silk-Worm, then a Butter-Fly: but in Spontaneous Generation, properly so called and of the second kind, it is impossible, that a more noble Form should remain in the Carkass or Excrements. But these things will be more clearly understood, now we come to particulars.

Chap. 6. *Of the Spontaneous Original of Plants, and first of the Generation of Mushroms.*

Spontaneous live things how manifold they are.

NOw al living things Spontaneously generated whether of the first or second order, do belong either to Vegetables or to Animals. And both of these again are twofold: Vegetables are Mushroms, Puck-Fists, Mos, and perfect Plants; Animals are Plant-Animals, and true Animals.

The Generation of Mushroms and Puck-fists.

In the first place all Puckfists are generated without any tillage or manifest Seed, which as *Scaliger* saies are to themselves Root, Stem and Fruit; also Mushroms, and Toad-stools, which spring up so swiftly that they are generated in one Night, and attain that greatness which belongs to their Nature. For they neither afford any Seed of which to be generated, nor are they procreated and multiplied by setting any part of them into the ground. Since therefore they are bred of their own accord, they must needs have the common way of generation with other Spontaneous Live things of which we spake before. For whereas *Matthiolus* writes, that the Earth by an hidden faculty doth breed Puck-fists, and Mushroms in her self, that must be fitly explained. For the Earth is not in it self and by its own Nature the efficient Cause of Puck-fists and Toad-Stools, but a Soul lying hid in the Earth, or in some Juyce mingled with the Earth. But whence that Soul proceeds is not so manifest.

Whence toad-stools have their Soul.

Fortunius Licetus, Lib. 3. *de Spont. Viv. Ort. Cap.* 4. thus writes thereof: the Spontaneous Original of Puck-fists and all Toad-stools in general, is, when the Soul of a more perfect living thing, Plant or Animal, abiding in the Carkass, as in a Vessel, being much impaired, and having gotten a matter not exactly disposed, and having none of the best instruments for the Organization of the parts, communicates it self for a Form and quickening Soul to the subject matter, first disposed by the moist warmth or heat of the Ambient Air, which works chiefly upon the Earth in the Spring and Autumn, with Thunder and Rain, or rather with the Sun,

after

after Rain. The same *Licetus*, *Lib.* 3. *de Spont. Vivent. Ort. Cap.* 5. conceives that the matter of Toad-stools is an aliment fit to nourish plants, falling upon the ground from the Carkasses either of other Plants or of Animals, which when the neighbouring Plants do not draw to nourish themselves, the Soul of its own accord turns it into Toad-stools and Puck-fists.

The kinds of toad-stools or Mushroms

But in very deed, there is not only one kind of Toad-stools, as hereafter will appear when we speak of their differences. Some grow to Trees, some Spring out of the Earth. The former proceeds from the Soul in the Body of the Tree, mistaking by reason of the unfitness of the matter it works upon, but not from the Soul weakned. And as in Man certain Toad-stools are bred, sundry sorts of Warts, Wens and other Excrescences, by reason of Vitious Aliment, which Nature changes into the best Form it can, and such as the Nature of the place will bear: so also in Trees, especially those that are aged, when either vitious Aliment flows in, or in a weak part it is not well digested, Nature generates such like Toad-stools. The rest have their nourishment in the Earth, but not all that which *Licetus* would have. For if all that which *Licetus* would have were the immediate matter of Toad-stools they would grow every where in Fields and Gardens; since there is such matter in all places: which nevertheless doth not come to pass. Nor hath it ever been observed, that Toad-stools and Puck-fists were bred out of Animals; as for those which are said to breed upon men, they are only so called by way of similitude.

All toad-stools or Mushroms arise from Plants.

And therefore I conceive it is more probable that Puck-fists do arise and grow only upon and out of Plants. And that in the Earth they are generated out of the Roots and Barks of Trees and Shrubs, either Putrified and Corrupted, or sending some Juyce out of themselves, and consequently of such matter which was the proper and immediate subject of the Soul of the Plant, and contains in it a subordinate Form, which being afterwards stirred up by heat, and having got a fitting matter it turns to a Toad-stool to which it is Naturally disposed. For when somwhat is separated and divided from the Tree, and is no longer governed by the Form of a plant, then that concealed Form is stired up by the moist Heat of the Earth about it, and begins to exercise the Function of a Soul, and of its subject matter being disposed thereto it forms the Body of an imperfect or half Plant. Whence it is that after Thunder and Showers great store of Toad-stools are wont to Spring up. And that which Rains especially coming down with Thunder do perform by their Warm moisture, that also Leaven mixt with Blood-warm water can effect. And *Matthiolus* writes, in *Lib.* 1. *Dioscorid. Cap.* 93. that a white Poplar Tree cut off close by the ground to the very Root, and Sprinkled with hot Water wherein Leaven is dissolved, within four daies brings forth store of Mushroms or Toad-stools very pleasant to Eat.

Toadstools from a white poplar tree.

Why toad-stools are so suddenly Generated.

And because Toad stools are speedily Generated and grow up, *Licetus* holds *Lib.* 3. *de Spont. Viv. Ort. Cap.* 10. that there must needs come together at once many such Atomes as are fit to Generate Toad stools, so as to make up a sensible bulk; because the Soul of one Atome is so weak, that it cannot vivifie nor shape the matter of a Toad-stool, nor perform that which the Souls of many Aromes flowing together into one Body and becoming one, can do. But there is some doubt in this point. For wonderful, truely, is the Nature of Forms and Souls, which of it self hath no quantity, and hath the same force in a smal Body which it hath in a great. Nor doth the bulk of a Toad-stool prove that which he saies; since we see of an exceeding smal Seed a great Plant doth arise, matter being drawn out of the Earth for the formation and Augmentation thereof. The most swift encrease of Toad-stools doth rather seem to perswade what *Licetus* thinks; since it is not credible, that in so short a space of time a Soul lurking in so smal a Body can draw to it so great a quantity of matter. Unless any man will peradventure say, that the matter is prepared by little and little by the Soul of the Toad stool, and afterward it suddenly Springs up.

The Differences or Sorts of Mushroms or Toad-stools, and of Puck-fists.

The differences of toadstools.

And although all Toad-stools do arise from plants, and the Roots, Branches, Stocks, and Barks of Trees and shrubs: yet there is great difference amongst them,

in regard of diversity of their matter. For some grow to Trees and Wood, some grow under Trees and in the ground. Nor is it easie to find a Toad-stool where there is not or hath not been some Tree or Wood. And the matter, truly, of such as grow upon Trees and Wood proceeds in the first place from the substance it self of the Trees, or that matter which is the proper subject of the Soul of the Tree. But a Toad-stool is not made thereof, so long as it is under the dominion of the Soul of the Tree, or Shrub, but when it is deserted thereby, and either the whole Plant, or some part thereof comes to die. And therefore we see that Toad-stools for the most part do not grow upon sound and uncorruped Trees, but on such as are old, and in some part decaied. Secondly, The vitious Aliment of the Tree or Shrub. Thirdly, some Excrement shed from the Tree or Bark; whence *Pliny, Lib.* 22. *C.* 23. writes that Toad-stools are bred of the Flegm of Trees. And indeed, it is credible that Toad-stools which grow on living Treees by means of the two last causes and manners are the works of the Soul it self of the Tree. For like as, according to what was formerly said, Toad-stools and Warts are generated on the Body of Man, while Nature, which is never idle, turns and Forms the vitious and superfluous Humor (which breaking through the Membranes and Pores, it cannot change into the substance of the part, by reason of the unfitness of the matter and the weakness of the part) into such a substance; so credible it is, that the same doth happen in trees.

The original of toad stools which grow upon Trees.

The matter of those which Spring out of the Earth is either some part of a Root, or a Bark, or some other part separate from the Tree. And therefore where Toad-stools are bred, there for the most part you shal find the Barks and parts of Trees, which when they are corrupted and Rot, by Rain falling upon them they are covered in the Earth, and being cherished with the Heat thereof are changed into Toad-stools. And that also may be artificially procured. So of the Leaves of Poplar Trees cut in pieces and buried in the ground Toad-stools do arise, as *Scaliger* observes *Exercit.* 104. *Sect.* 17. the same happens of a Fig-Tree buried underground, as *Athenæus, Lib.* 2. *Cites from Nicander*, whose Words are these.

Toadstools Springing out of the Earth.

Out of a poplar tree

Out of a Fig-tree.

Cover a Fig-Tree under store of Dung,
And Water't well, then store of Mushrooms Yong
Will Spring apace.

Hitherto also may be referred the Toad-stools which grow out of Tree branches burnt; of which *Cardan, Lib.* 13. *de Subtil. Page* 509. you shall have Mushroms when you burn dry sticks, and Rain fals upon them, or (in case it Rain not) if you sprinkle Water upon the remainders. And that this is so, not only when the sticks are burnt, but also when they are not burnt, any one may easily try. For when I had used to manure my Garden with Earth that had smal fragments of sticks mingled therewith, the second year there grew up store of smal Mushroms or Toad-stools al about.

Out of tree branches Withered.

Again though no part of the Tree or Shrub be found evidently corrupted in the ground: yet of them Toad-stools are bred, when the Juyces or Excrements of Trees lie hid in the ground. For such is the Nature of these more Ignoble Forms, that even in the smallest Atomes and Juyces they can remain intire, which afterwards gaining a convenient place, and being stirred up by the heat of some Ambient Body, they rouze themselves, and Form and shape the Body of a Toad-stool. For since a Soul can abide in the smallest Seeds of Plants, and when it gets place and matter it can Form a great Plant: why may not these Forms much more Ignoble be preserved entire in the smal Bodies or Atomes of Plants?

Now the chief cause of the variety of Toad-stools is the diversity of Trees and Shrubs from whence they arise; for some sorts grow upon or under some kind of Trees or Shrubs, and some upon or under others. So, those great and very white Toad-stools like a mans Skul, which Chirurgeons use to stop Blood, and are called *Crepitus Lupi*, do hardly grow any where but in Vineyards, and they grow out of Vine Branches dead and corrupted. Also the variety of the Parts themselves of the Trees.

The variety of Toad stools.

Howbeit, I am apt to believe that the variety of Toad-stools doth not only depend upon the diversity of the matter which Trees afford them, but also upon the

the variety of matter which is otherwise found in the Earth. For seeing certain it is that all this great bulk of some Toad-stools doth not come from the Tree, doubtless the form or Soul communicated by the Tree doth in the Earth associate such matter as it meets with, and thereof frames to it self a convenient Body; as also we see that small Seeds do draw matter and aliment out of the Earth, and that thence great Plants grow up. And that the Soul of the Toad-stool doth snatch any Obvious matter, and thereof shape a Toad-stool, appears even hereby, that *Pliny Lib. 19. Chap. 2.* writes: We know what hapned to *Laertius Licinius* a Pretorian, being Judg at *Carthage* in *Spain*, a few years since; who biting a Mushrom had his fore Teeth loosned by a Brass Farthing that was therein.

Of the Harts Toad-stool or Boletus Cervinus *so called.*

And since among other Toad-stools, both in regard of the shape and strong smel, the *Fungus Cervinus* or Harts Toad-stool is remarkable, Now *Matthiolus* writes thereof, as of a thing by himself lately found out, *Lib. 3. Epist. Ult. ad Julium Moderatum* in these words: seeing I know that you are much delighted with novelties, I have sent you with these my Letters a certain Subterranean Puck-fist, which the Bohemians cal Harts Mushrom. For I conceive it is a thing you never heard of before, because no Ancient nor late writers make any mention thereof; and because it is not to be found, save in those Woods where there are many Harts and Hunters, who know these secrets of Nature: but because these things are unheard of in your parts, I will not have you any longer unacquainted with the History and Virtue of this Toad-stool. Now Hunters relate that this Toad-stool after the manner of ordinary puck-fists grows under the ground, where the Earth is infected with the Harts Sperm falling thereupon. Which many times happens when the Male draws his Yard out of the Genitals of the Female containing Seed in the passage, by reason of the Females withdrawing her self from the Violence of the Male. And perhaps no man could ever find this Toad-stool, did not the Harts themselves at a certain season of the year discover the place where they grow. For led by a Natural Instinct they scrape with their fore Feet upon the ground whereunder the said Toad stool grows which they are said to discern by the smel. For the Toad-stool hath a very strong smel, especially when it is first dug up. Hunters and Country-men which are acquainted with the Secret and frequent the Woods diligently observe the places, being drawn by the Harts Feet, and digging the pit they take out the Toad-stools and sel them to the Apothecaries, who cut them in pieces, draw them upon Threds, and dry them afterwards in the shadow, and keep them for Medicinal uses. They are of the same shape (for the most part) which we see in other Puck-fists, yet all are round like Globes and uneven. The outmost thin Rind is swarthy somwhat, but the fleshy *Fungus* substance is white. Some say there is a certain kind of these Puck-fists resembling a mans Yard Erected, with the Nut uncovered, and at the other end certain Knobs resembling Testicles. But that vulgar Opinion of the Hunts-Men touching the Original of these Toad-stools sounds like a Fable, into which perhaps the strong smel, and in the latter sort the shape, might bring them. Whereof *Thomas Jordanus, de Pest. Phæn. Tract. 3. P. 605.* They exceedingly commend the Harts Toad-stool so called, bred of the Sperm of that Beast, and found by the Goates Scraping up of the Earth. They are found truly in such places where in the Memory of Man there was never any Hart seen. At *Trenzine* a Famous town of *Hungary* about the Clifts of *Carpathus* they are very plentiful; in Mountanous places, and dark Woods, where though you may find Harts, yet is there not so great plenty, as to suffice for the Generation of Wain-Loads of these Puck-fists, if that were to be thought true which is related of their Generation. Also I have as touching the latter kind been brought into a suspition by what I observed here at *Wittenberge*, in the year 1626. For the Trench being to be repaired and the City to be fortified, the Captain of the Garrison walking accidentally in the Ditch, drawn by the smel, he found one of these Puck-fists having the form of a Mans Yard, and wondering (for he had from Hunters drunk in the foresaid Opinion concerning the Original thereof) how in a place where no Hart had been this Toad-stool could be Generated, he brought me to the place, and being some spaces distant I also perceived that same exceeding strong smel proper to this kind, and under an

The Harts toad-stool is not bred of Harts-Seed.

Elder Shrub I found ten such Puck-fists. But seeing it is certain, that there never came any Hart into that place, probable it is, that such Puck-fists are not Generated of the Harts Sperm, but of the Juyce or corruption of some Plant, and matter determined to this kind of Toad-stool, arising from some certain Plant.

Toad-stools growing out of Stones.

Toadstools out of Stones.

Moreover this is also worthy of consideration whether Toad-stools or Puck-fists grow out of Stones. Many learned men affirm the same, and hold that there are Mushroms fit to Eat growing out of Stones. *Jul. Cæsar Scal. Exercit.* 173. *Sect.* 2. writes: *The Particular Nature of a certain Stone is to be reckoned amongst the most wonderful. This Stone is highly esteemed by the Romans. I saw one at Naples, in which Kingdom they say they are found. It hath a thick crust. Which being covered with Earth nine inches deep, and sprinkled with warm Water, the fourth day after it sends forth Mushroms.* And *Cardan, Lib.* 13. *de Subtilitate,* saies: *Mushroms grow from certain broad Stones buried underground, after the manner of measures, four inches underground within four daies Water being sprinkled thereupon. They abound in groves and grow speedily: for they require a dry heat, and therefore those stones must have some adustion, for the Generation of Mushroms is speedy, and as it were without a Root, for nothing grows without a Root indeed. For if it draw aliment, if it live, or grow though it live not, it draws out of the Earth; now that which draws must be Joyned to that whereout it draws; and the part whereby it is Joyned is the Root.* And *Matthiolus* upon *Dioscorides, Lib.* 4. *Cap.* 78. hath these Words: *Mushroms are at this day in so great request at the Tables of* Italy, *(where they are most frequently Eaten) that at Naples stones are found, which being Dug up and carried into Wine Cellars, covered a little with Earth, and now and then sprinkled with Blood-Warm Water, within four daies they produce pleasant Mushroms. These Stones I have seen at Rome and Naples; where they are kept with great diligence, because by help of them they can Eat Mushroms when they please.* Which is confirmed by *Johannes Baptista Porta* the Neapolitan *in Sua Villa Lib.* 10. *Cap.* 70. The last kind of Mushroms (quoth he) are Bred out of Stones. They are cropt off to be Eaten, and fresh ones grow up, by a continual fruitfulness, They grow to their perfection in seven daies; sixtimes a year they cut them off; the Stone is covered with nine inches depth of Earth. The Stones are brought to Naples from the Mountain *Vesuvius*; to *Surrentum* from *Fagetus* the highest Mountain of that Tract; to *Abellinum* from the *Parthenian* Mount; in *Apulia*, from *Garganus* and the highest part of the Mountains; for when they once perceive the stones have born Mushroms, they dig them up, and expose them to sale. Sometimes they do not grow in the fashion of Caps, but like Tendrels or in the shape of *Asparagus*, and divided into branches. And *Fortunius Licetus Lib.* 3. *de Spont. Viv. Ort. Cap.* 11. relates, that *Jacobus Antonius Marta* a Neapolitan told him, that the *Parthenian* Mount aforesaid, the highest of all the Mounts in the Territory of Naples, in the top thereof hath store of Stones of a wonderful Nature, which being put under the droppings of the Wine Spiggots, and drinking in the drops of Wine do in the morning afford Mushroms, sprung up the night before, delightful to the taste, and not prejudicial to Health.

what kind of Stones they are out of which Mushroms grow.

But, forasmuch as the said *Licetus*, in the place cited, relates, that he saw at *Padua*, in the Garden of *Benedictus Sylvaticus* a Famous Physitian, three such Mushroms bearing Stones, sent him from the Country of *Naples*, and that he did Eat Mushroms which grew upon them; and adds, that those Stones were very soft, yielding to the touch, so that they seemed rather pieces of Wood then Stones; we may justly conclude, that Mushroms never grow out of true Stones, but that these Neapolitan Stones so accounted are pieces of wood, by a Stone-making Juyce hardned into the Similitude of Stones; or as *Licetus* would have it, that these Stones had their original from Earth, which being ful of the parts and Juyces of Plants was by a stone-making juyce hardned. Which Woods or parts of Plants containing in them the Form of a Mushrom, when by the pouring on of Wine or warm Water they come to be softned, and to be mingled with the juyce of the Earth about them, and by the heat of wine or warm water to be digested, the Form lying hid within breaks into act and Forms the Body of a Mushrom. But those Mushroms which are bred

bred by Wine dropping upon the stone do owe their original chiefly to the Wine. Yet the Clay which is there found, or is Generated by the continual dropping of the Wine upon the Stone may be mingled therewith. *Mushroms growing from Wine dropping upon the Stone.*

Chap. 7. *Of Plants which grow up of themselves.*

NOW several Men are of several minds as concerning the manner how Plants come to grow of their own accord. Some follow the Opinion of *Erastus* propounded *Chap.* 1. and hold, that every Earth is endued with a peculiar faculty of producing Peculiar Plants, or that it hath a Seminal power communicated by the blessing of God at the first Creation, which is brought into act by the Sun and influx of the Stars. And they are induced so to think, because, if Earth digged out of the deepest Pit or Well be placed upon the highest turret, it produces Plants. And *Johannes Baptist. Port.* writes *Lib.* 2. *Phytognom. Cap.* 1. That when he had gotten Earth out of the deepest Cellars of certain Houses, that there might be no suspition of Seed, and had set it in the open Air on the top of his House, left the wind should bring seeds into it from elsewhere, not many daies after out of the several sorts of Earth in so many baskets several kinds of Plants Sprung up, but such as usually grow in the Neapolitan Soil. For clayish ground did bring forth one sort, the *Puteolan* Mould another, gravelly Earth another. And *Porta* adds that in the Island of *Crete*, whithersoever a man carry the Earth, unless somwhat else be sowed therein, it presently brings forth Cypress. And most certain it is, that in Fields and Meadows some Plants are Natural to one Field or Meadow, some to another. Which Opinion if any man will follow, I shall not quarrel with him. Yet these doubts occur in this Opinion: first, that God did once command the Earth, at the Creation, to produce Plants, and it was accordingly done: And he blessed the Plants, and commanded them to produce their Seeds, whereby they might multiply themselves, but he did not bless the Earth. Which doubt whether it can be answered by saying, that it is not to be understood of simple Earth, but of the kinds of Earth, of which Questionless there are many, and they mixt Bodies, and that these mixt Earths have a Seminal faculty put into them by the Creator whereby they produce Plants; I leave to the Judgment of the Reader. St. *Ambrose* seems to incline to this Opinion, who in *Lib.* 4. *Hexamer.* Writes thus concerning this matter: *That first word of God whereby he created all Creatures, is the Law of Nature, which hath continued ever since in the Earth, giving a rule to Future succession.* Another doubt is, that this Earth doth not bring forth Plants before it is moistened with Rain. So that the Seminal Virtue may seem rather to be communicated thereto by Showers of Rain, then to be Naturally implanted therein. *Plants, how they grow up of themselves*

But suppose, indeed, that this is one manner of the Spontaneous Generation of Plants; Yet is it not the only manner: but that oftentimes Seed is communicated from elsewhere to an Earth of it self barren, appears even hereby, in that it hath been observed that after Rains and inundations of Water new Plants have sprung up in certain places. But how this comes to pass, is not very apparent. I conceive that all this Spontaneous Generation of Plants, may be reduced to those two manners, which I formerly propounded in General. For some plants although they are not Generated of Seed manifest to our senses, nor spring from branches set in the Earth, yet they really proceed from another Plant of the same sort, and from the Seed thereof; which although it be not in a visible Body, yet is it in the smallest Particles or Atomes containing the Soul of the same sort, which Particles may lie concealed in Rain or in the ground; whose Soul having afterwards gained a fit place, and being provoked by the heat of the Ambient Air, it displaies it self. *Licetus* indeed, *Lib.* 3. *de Spont. Vivent. Ort. Cap.* 13. doth grant that these Atomes perform the Office of Seed, and answer to Seed by way of proportion, but he denies that they are really seed: but I see no cause why he should do so, unless peradventure inasmuch as this Seed hath no external Figure as other Seeds have; meanwhile it may wel be called a Seminal Principle. For an external Figure and a certain manner of Formation doth not primarily constitute Seed, but the Soul lying hid in the same with that same implanted Spirit which is said to answer to the Element of the *The manner of the Spontaneous generation of Plants.* *Whether Atomes containing the Soul may be called Seed.*

the Stars, and makes the Seeds fruitful: which because they with their subject may be in the smalleſt Atomes, there is no cauſe why they may not be called a peculiar ſort of Seeds, or a Seminal Principle. And although the Soul which lies hid in ſuch ſmal Bodies or Atomes doth not inform the Earth or Water wherein it is contained, but lies therein concealed as in a Veſſel; yet thoſe little Bodies it informs wherein it is as its proper ſubject, and is in them according to its firſt Act, and it then comes to its Second Act when it hath got a convenient place.

But other Plants are more properly ſaid to be Spontaneouſly Generated, when they proceed not from a Seed or Soul of the ſame ſort, but from that Form which in a more noble Plant was inſtead of the next matter, and the ſubject of its ſpecifical Soul, juſt as Toad-ſtools (whereof we treated in the former Chapter) and moſs do grow upon Trees.

The generation of Moſs.

Now Moſs grows upon ſundry Trees, as on the Cedar, Poplar, Oak, and Pitch-Tree, from which in the Mountains of the Valley of *Anania* above Trent, *Matthiolus* ſaies he had frequently gathered very long Hairy moſs, much ſweeter and fairer then that which grows upon the Poplar and Oak, *in* 1 *Dioſcorid. C.* 20. Yea, and there is hardly any Tree but when it is old it bears Moſs, and it is a token of a Trees being Old, when it begins to be covered with Moſs. Alſo *Fab. Columna* hath deſcribed ſundry ſorts of Moſs, *Minus Cognitar. Stirp. Lib.* 10. *Cap.* 158, 159, 160.

To Moſſes belong the kinds of Liver-wort, which although, as *Dioſcorides Lib* 4. *Cap.* 48. writes, it grows familiarly on Stones, as on Rocks, the Stones of Wells, the Tiles of Houſes: yet the ſame *Fabius Columna* tels us they grow alſo upon the ſtumps of Trees, in moiſt and Champian Countries eſpecially, in the foreſaid Book, *Cap.* 154. Yea in our Countries alſo that ſame kind of Moſs which they cal Tree-lung-wort doth grow upon Trees.

The Generation of Plants out of dried Plants.

Nor muſt we here paſs over that ſingular Opinion of *Fortunius Licetus*, which will ſeem a Paradox to ſome, touching the Generation of Plants out of dried Plants, which are commonly thought to be dead and void of all Soul. We have in General, indeed, ſpoken ſomwhat hereof before: yet I think fit more Particularly in this place to repeat the ſaid Queſtion, and more clearly to explain the ſame. Now *Fortunius Licetus* is of this Opinion, that the ſame Soul which did conſtitute the Living Creature doth remain in the dead Carkaſs, but doth not inform the ſame: Yet that it doth again rouze it ſelf, and is able again to perform the Office of a Form; and that two manner of Waies. For ſomtimes the ſame Soul (he ſaies) being decaied and weakned doth procreate imperfect things: and ſomtimes again, as he ſhews *Lib.* 3. *de his qui diu ſine Alimentis Vivunt, Cap* 7. out of the Body which is accounted for dead a new plant is produced. Foraſmuch as Plants pluckt up out of the Earth, or broken off from their Roots or trunks, do not preſently die, only being deſtitute of a fit place out of which they may draw Aliment they cannot grow, and they ceaſe bearing branches, leaves, and Fruits; yet in the mean time the ſelf ſame Soul doth Vegetate that Body: as ſeeds that are kept in the Winter time ſhew no other ſign of a Soul in them, but that their Body is thereby kept alive; whence it is, that the ſaid ſeed is fit to be ſown and to be uſed in Phyſick: but when it is no more animated but corrupted, it becomes both unfit to be ſown, and loſes all its vertue in Phyſick: If the Wood of an Olive (ſaies he) be ſimply dry, it will live no longer; ſince life conſiſts in moiſture, and dryneſs according to *Ariſtotle* is the Death of Plants; but there wil be the Carkaſs of an Olive-Tree, wherein with ſome degree of Heat, and ſome Foot-ſteps of the former temper, (if the Soul be yet contained in it as in a Veſſel; not quickening the Wood) when it is digged up and hath gained a fitting heat for life from the Ambient Air, and like its former temperament, then it becomes fit for the Soul again therein as the conſtituting Form of an Olive Tree to ſhew it ſelf: but if the Olive Wood were not exactly dry, but ſtill had life in it, it would ſprout of it ſelf, and produce an Olive Tree, by a non-Spontaneous Generation. Now this chiefly brought him into that Opinion, in that Woods do laſt many Years and preſerve their ſtrength. Yea, and which is ſtrange, it hath been obſerved that they have ſprouted the Second time and performed the operations of the Soul. Of Which *Virgil*, 2 *Georgic.*

A dry olive ſtock wil ſprout againe.

Some

Some need no Roots; the Pruner Young Slips cuts,
And them into the Earth securely Puts.
And (wondrous to be told) an Olive Tree
Out from a dry cut Trunk oft Springs we see.

Which Verse although some interpret concerning ingrafting: yet they do it contrary to the mind of *Virgil*, who treats of ingrafting in the verse following. And why should that be counted a wonder? But *Servius* hath rightly interpreted this Verse. That (saith he) which is here said is true of the Olive and Myrtle, whose dry stocks are cut to the middle or pith, and so put under ground, and from them Trees do shoot forth, which is strange indeed. *Theophrastus* taught the same thing *Lib.* 5. *de Caus. Plant. Cap.* 4. who writes, that in an ordinary course of Nature the dry wood of an Olive Tree will sprout again. For those Woods also, saith he, which sprout of their own accord, as the Olive-Tree-Wood, and all such like, which they reckon for Miracles and Wonders, have their Reason in Nature. For they are Naturally long lived and apt to sprout, because of their thickness and moisture, and therefore as soon as they are sensible of any Liquor from without, presently they send forth branches. In very deed, for the most part Wood covered with Earth and laid in moist places doth Sprout; besides that, a bough cut off hath been seen to shoot forth Twigs soon after, because it had in it moisture enough, and the Spring was at Hand, the like whereof happens to the Squil or Sea Onion, and such other Plants as Sprout after they are hanged up in the House. And the said *Theophrastus* in *Lib.* 5. *de Hist. Plant. Cap.* 10. writes, that the Wood of the Olive Tree doth above all other Woods Sprout and send forth Twigs, both rude, or rough and when it is wrought into some work, if it be sensible of any moysture and have attained a moist place, so that a part of a folding door hath been said to Sprout, and a wooden Cup which fel into the Dirt. So, credible Authors relate that *Hercules* his Club which was made of Olive-Tree-Wood did Sprout. And *Fortunius Licetus*, in the place fore alleadged *Lib.* 3. *de his qui diu vivunt sine Alimento*, *Cap.* 7. writes that he saw at *Rechum* in the Garden of his Unkle *Bartholomeo Licetus*, the stock of an Olive Tree which had been Planted, and was now near dried up and had been Naked ten years together, and of it self separated from the Trunk, and never after that Planted in the Earth; which being thrust into the ground near a Wel to prop up some other Wood, and Nailed to the Wood which it bore up with Iron Nailes, it budded and branched many Olive branches laden with Leaves and Fruit, and afterwards bare in like manner, many years. *Johannes Ludovicus de la Cerda* confirms the same, who, upon that Verse of *Virgil* aforesaid, commenting, thus writes: the Eyes of many most skilful Husband-men have been witnesses, of whom I made enquiry: the Art it self is a Witness, which is now much in request in *Spain*, where at present I live. The Husbandmen cut the stock of an Olive Tree (whose Root and branches are taken away) into many parcels, and so they bury it in the ground, which forms first a Root and then a Tree, which *Virgil* wonders at; for it is really a wonderful thing.

Hercules his Club did sprout.

Other Trees also besides the Olive have been observed to do as much. Yea *Aristotle* himself grants, 2. *Phys. Cap.* 1. that a Wooden Bed-sted buried in the ground may Sprout. They report as much of the Male wild Ash, of which *Romulus* his spear was made, which *Plutarch in the Life of Romulus* writes that it took Root again, and sprouted. Which *Ovid* confirms *Lib.* 1. *Metamorph.*

The spear of Romulus being made of Ash sprouted.

And as Astonisht Romulus *of Old*
Did on Mount Palatine *his Lance behold*
To flourish with green Leaves: the fixed Foot
Stood not on Steel, but on a living Root.
Which now no weapon, spreading Arms displaid;
And gave Admirers unexpected shade.

And *Julius Cæsar Scaliger*, in *Theophrast. de Caus. Plant. Lib.* 5. *Cap.* 1. Writes, that he hath seen Willow Rods carelesly thrown away, and not so much as stuck into the Earth, to sprout, yea and a great Trunk of a Poplar long after it was cut off.

The

The premises therefore being such, and confirmed by the Testimony of most learned men, Yea, by experience it self, upon which the Judgment of *Licetus* is founded, although his Opinion seem Paradoxical, yet it is not simply to be rejected, but to be dextrously explained and limited. This in the first place is certain; that all Plants pluckt up out of the ground do not presently die, as may be seen in the Squil and the American *Sempervivum*. But that all Plants pluckt up out of the Earth and dried should retain their Souls and live, and that only nutrition in some sort ceases in them, this cannot easily be granted, especially if the Root being cut off, and the bark taken away, they be cut in pieces. Much less can it be granted, that the Carkasses of Animals do retain their former Soul. For every Soul requires its proper subject, *viz.* Innate Heat, consisting of the implanted and influent heat, in Animals; but in Plants, likewise, a temperament so and so disposed, which because in dried Plants it is changed, so they come also to lose their Life.

All Plants do not die as soon as they are pluckt out of the Earth.

But because the former experience cannot be denied, we are now to enqure how it hath and may come to pass, that the Wood of a dry Olive Tree should Sprout again. Which though it be hard to find out, yet because it is not Miraculous but Natural, I will propound my Opinion: let every man follow what Opinion he likes best. And in the first place, this must be remembred, as hath been many times said before, that there is not one manner of the Propagation of Plants. For all Plants are not propagated by Seed formed after a certain fashion, and included in one part, but that same juyce containing in it the Seminal principle is in many diffused through the whole Plant; so that those Plants may be propagated by a slip or branch put off, or by their Roots, and so multiply themselves; and after this manner the Seminal faculty communicated either from Seed properly so called, or from a Root, or any other way from a Plant of the same sort, may many times lie long hidden. *Jul. Cæsar Scaliger* relates, that the Seed of Bears-Foot hath thus lain hid in the Earth eight years together, *Exercitat.* 140. In my little Garden (saith he) which is next my study, I planted Bears-Foot, I kept it a long time diligently. Some Thievish Herb gatherers, from whom nothing can be kept, had to my thinking pluckt it all away by the Roots. For above eight years there was no appearance therof. A Berberry was set near that place. The place it self was digged and rak't, and sowed with patience Seed, which they here falsly count to be *Raved*. The Patience grew and fild the bed and was gathered. I falling sick, that plat lay waste and was not stirred for three years together. This present year I find the remainder of my Bears-Foot, *viz.* two Plants with most beautiful neat leaves, a large stalk and fairly flowred. And therefore as in Wheat, Barley, Oates, and other dead Plants, the Seed may remain in the straw shut up in its Chaffie cases: so also, that same juyce containing the Seminal Principle, diffused through the whole Plant, may in some Plants dead and dried last for a season. And as (nevertheless) he should not say truly who should say that dried Oats or dried Wheat in the barn doth live, although in the dried straw a living Seed is contained: so also it must not be said that the foresaid wood doth live, but only that it containes in it self a Seminal principle. Yet few Plants once dried do recover that same Ancient Seminal disposition which was necessary to the exercise of the Second Act. That it sometimes so happens in the Olive Tree hath been observed, since it above all others abounds with that same Fat Balsamick Juyce. That the same hath hapned in an Ash and Poplar hath been said before. But that Herbs after they are rotten and corrupted may revive again, daily experience shews, while in Fields and Gardens manured with Dung those Plants which have putrified in the Dung are Generated, the Juyce which contains the Seminal principle having remained unhurt. And al Husband-men know, that of Hogs-Dung Sow-Thistle is bred, in Vine-yards, Gardens and Fields. This Thistle is a Familiar food to Swine, and therefore the Germans call it *Sæw-Diestel*, Sow-Thistle. And al these things although they seem wonderful and almost incredible: yet that they are true appears even hereby, in that also of the Tears and Gums of Plants Plants are generated, as shall be said hereafter.

Which way a dry Olive tree may come to sprout again.

Sundry waies of the Propagation of Plants.

Herbs that Rot, revive again

Of Hogs-dung Sow-Thistles are bred.

But although these things are true of Plants: yet the Souls of perfect bruce Animals cannot survive after Death. And whereas out of the Carkasses of Animals such Ignoble petty Animals are bred as aforesaid, that doth not happen because the Soul

The Souls of Brutes Mortal.

Soul of the Animal remaining the same being reduced to a more Ignoble degree does produce worms (for the Soul of a Man, a Lyon, an Ox, doth not go into such Animals) but because the subordinate Form lying hid doth then rowze it self up, as was said before.

Moreover, after both the manners before propounded sundry Plants do Spontaneously arise. For in the first place, out of the Ground although never sowed with any Seed some Plants do spring up of themselves, as *Virgil* said of Trees.

Some Plants without Mans labor freely come.

Now this doth not only happen when (which belongs not to this place) the Seeds themselves intire are carried by force of Winds or overflowings of Waters into some other place; but also when those little Bodies containing seed in them are carried thither either by Winds, Rain, or inundations of Water, or when some Plant of the same kind hath putrified in that place, and yet hath there left its Seminal rudiments. And thus *Pliny* writes concerning the Spontaneous Original of the herb *Laserpitium*, *Lib.* 19. *Cap.* 3. We find, (saith he) in most credible Greek Authors, that this Herb suddenly sprung up after the Earth had been moistened with a Pitchy shower, about the Gardens of the *Hesperides*, and the greater *Syrtis*, seven years before the building of *Cyrena*, which was built 143. years after our City. And the force of the shower reached four thousand *African* furlongs. Doubtless that same shower, so thick, black, and Pitchy as it were, did contain many smal Seminal Atomes of *Laserpitium*, containing in them the rudiments of that Plant, which being forced into the ground produced that Herb all along that tract of Land aforesaid. And after this manner, *viz.* those little particles containing in them the Seed being brought from elswhere by showers, Winds, inundation of Waters, whole Woods have sometimes sprung up of themselves, as *Theophrastus* doth witness, *Lib.* 1. *de Causis Plant. Cap.* 5. Also after this manner, in Earth digged deep out of the ground, and containing no Seeds in it, being exposed to the Air and Rain, Plants do Spring up. Unless any man will follow their Opinion which we mentioned at the beginning of this Chapter, who hold, that the Earth by Virtue of the divine Benediction given at the Creation hath a peculiar faculty to produce certain peculiar Plants.

Laserpitium bred by a shower.

How plants are propagated by Rains.

Moreover, Another manner of the Spontaneous Generation of Plants is, when a plant is generated out of another Plant of a several sort, in the Earth. The Generation of which Plants is the same with that of Mushroms, *viz.* When an inferior form which was formerly under the superior Form in the notion of matter, now the superior Form is lost, is set at liberty, and shapes a convenient House for it self. Thus Mos grows upon Trees. Unless any man will here also hold, that when the Soul through fault of its Organs (which happens in aged Trees) or badness of the Aliment, cannot change it into such parts as it ought to do, that it may not be idle it Generates Mos and such like Things.

Plants bred of Plants of a different sort.

Hither may be referred the degeneration of Plants, of which we spake also before *Cap.* 2 when a Plant springs indeed from Seed, but of a different kind from it self; when Water-Mint turns to mint; Wheat to Darnel; Barley to Oates, Basil into running Betony; a rape into a rediſh; a white Vine into a black; a black into a white; Barley in Wheat; Wheat into Barly, and other Plants degenerate into others, Where of *Scaliger* hath a rare example, *Exercit.* 140. I sowed with mine own Hand the Seed of the Vulgar Smallage, which they commonly but falsly call Persley, by a Wall which would defend it from the Summers heat; that growing up and preserved by the shadow it might serve for the Kitchins use. But it never sprung up according to the usual manner: but another Plant quite different therefrom, to my admiration. It was that which the more learned call *Scorodotis* and hath been hitherto falsly taken to be *Scordium* by many. Its leaves when it is yong (if you look on it at a distance) are like Violet Leaves, it hath a white flower, with the Smel and Taſt of Garlick. [*This should be that we call Jack by the Hedg, or sawce alone, and our Herbals Alliaria.*] In which case nevertheless a man must take heed that he be not deceived, and think that Plant which springs up from some secretly hidden Seed to arise from the degeneration of another. We spake before of Bears-Foot from *Scaliger*, *in the place lately cited*, how that when he thought it

The degeneration of Plants.

was Rooted al up, and had not appeared for about eleven years, at length it sprung up again.

How it comes to pass. Now how this degeneration comes to pass is doubtful: *Fortunius Licetus*, indeed, *Lib.* 4. *de Spont. Viv. Ort. Cap.* 35. and elsewhere, holds that Forms do also degenerate whiles they are weakned, and through weakness come to degenerate into weaker Forms. Now he writes that they are weakned, either by a contrary agent working upon them by it self; or upon the mutation of the subject upon which they depend as to their Essence; or from both causes together. So the Soul of a Calf when it dies degenerates into the Souls of Worms and Bees, which Spontaneously breed out of the Carkass thereof; so the Essence of Wheat is changed into the substance of Darnel and Oates; so heat Fainting away degenerates into Luke-warmness, so that not only the Forms of the substances but of the accidents also are changed, as he writes. But as was said before, this degeneration of forms, so that the form of a calf should degenerate into the form of worms, is not agreeable to Reason. Rather there is a certain kndred of Forms, as *Matthiolus* speaks in his preface upon *Dioscorides*, and some Seeds are Equivocal, that is, common as it were to divers sorts. And as the same internal Form Bears one while the Form of a Palmer Worm, another while of a Butter Fly, another while of another Worm, and then of a Silk Worm: so also in Plants, some Souls are so constituted, that, according to the disposition of the matter they may form now this, now that shape of Body; or they are so subordinate that one is Lady and the other a Servant, and the Lady exercises her Soveraignty so long as the matter of which the Plant is formed and nourished is wel disposed; but when there is any deficiency therein, the Hand-Maid takes the Soveraignty.

The Degeneration of plants where caused. *Theophrastus* disputes whether Plants degenerate in the Seed or in the Root, 4. *de Caus. Plant. Cap.* 6. and denies that it is made in the Root, because the Nature of the stalk, Leaves and Seed, do alwaies follow the Nature of the Root; and he concludes that it is made in the Seed, and that it grows fruitless either through penury or superfluity of nourishment. *Johan. Gallego de la Serna de Princ. Generat. Lib.* 2. *Cap.* 7. conceives that these degenerations of plants may happen two manner of waies, either because the Soul of the Seed weakned by faultiness of the matter could not produce its proper issue, and bred a monster, as happens in Animals; or because the form of Wheat, for example, is quite corrupted, and upon the corruption the matter remains so disposed, that by the universal cause the form of Darnel or Spelt may forthwith be produced in it. But neither of these waies may be simply allowed. For, as to the first, this is true, that through fault of the matter the Soul cannot produce that which it is ordinarily accustomed to do, otherwise. Yet that Body which it produces is not alwaies a monster. And the generation of Monsters is tied to no certain Rules. But the degeneration of Plants is made certain waies, and such Plants degenerate into such and no other, or not into any at least. But the second manner is absolutely false, *viz.* That the Soul is corrupted, and from the disposition of the matter remaining the universal Cause produces another. For the Universal cause doth not produce any specifical effect. And he acknowledges, that the said effect is not indefinite and indeterminate, and that of Wheat Turnep or Cole-wort is never made, but only Darnel or Spelt. As also of the Carkasses of Animals only some sorts of Animals arise, and not any whatsoever. This therefore is more likely, that the Creator hath given to those forms the faculty to shape themselves sundry Bodies; so that when the matter is rightly disposed it makes some kind of Bodies; and so of Wheat grows commonly Wheat, but when the matter is ill disposed, yet that Nature may not be idle it hath the power to produce another Body; for examples sake, when the Soul of Wheat hath matter indisposed, it makes the Body of Darnel or Spelt. And it is here much after the same manner as was said before concerning Palmer Worms and Butter-flies, where the same form at sundry times makes sundry Bodies. And that the Soul doth not perish appears even hereby, in that after Spelt is sprung from Wheat, black Oates from white, if it find again a convenient soil it will return to Wheat and white Oates again.

And although all Spontaneous Generation of Plants may be reduced to these two manners, whether it be properly or improperly so called: yet that the thing may be more Plain, I think fit to explain this business according to the matter and subjects in which these Plants Spontaneously arise.

Secondly

Secondly therefore, what hath been newly said of the Earth is much more true of Dung; since therein lie hid and Jumbled together the Seeds, parts and juyces of sundry Plants, and other things, and al the causes of Spontaneous Generation in the Earth may be found much more in Dung. *Plants arising from dung.*

Thirdly, That many Plants Spring up in the Waters, Duck-weeds, Water-Lillies, Water Caltrops, and many others, is most notoriously known. Now such Plants are not all of them Spontaneously Generated (to speak properly) but the Roots of some are divided out of which new ones spring up, others sheed the Seed which they generate into the Waters, whereof Plants of the same sort are bred, and the Seeds of Plants by the Wind and Inundations of Waters are brought in from other places. But those which are so Spontaneously bred that they spring not from intire Seed, are Generated either from Plants putrefying in the Waters, or from Atomes or smal Bodies having Souls in them, falling into the Water in Rain showers; which may also be caused by the Winds, when they blow into the Water amongst the Dust such petty smal Bodies containing the Souls of Plants in them; or because from the Roots of Trees some Juyce or Excrement containing in it a Seminal principle is shed into the Water. For by all these manner of waies those petty Bodies containing the Souls of Plants, or at least their forms which will turn to Souls when they meet with fit matter in the Water, (which chiefly comes to pass in standing Waters) and are cherished by the ambient heat; they are rouzed up, and generate such a plant as they are Naturally fitted for. *Plants breeding in the waters*

Fourthly, Some hold that Plants are also bred out of the Snow. But more credible it is, they grow under the Snow. For although it may come to pass, though seldom, (for that cannot easily happen in Snow which happens in Rain) that petty Bodies (with the rudiments of Plants in them) may descend with the Snow: yet the heat by which they might be brought into act is wanting therein, and therefore very seldom or never, if by chance the Snow begin to be warmed and Melt with the heat of the Sun, or if that part of the Snow especially being deep which is next the Earth do begin to be warm through hot Exhalations Springing out of the Earth, and the Soul lurking there be rouzed up and brought into act, Plants are bred out of the Snow. *Plants out of Snow.*

Fiftly, 'Tis also found that some Plants grow upon other plants. So, many times, upon Willows great Celandine, Bitter-sweet and sometimes Elder doth grow, yea and Services and other Plants. Which happens, either because whole Seeds are brought thither by the Winds (which yet is not Spontaneous Generation properly so called) or smal Bodies containing in them the Seed of Plants are brought by the Rain or Wind. Now this happens chiefly in those Trees in which part of the Tree begins to Rot, and turn to dust as it were: which often happens in old Willows cut off about the Head as they cal it. For since there is found matter fit to Form and Augment a Plant, the Soul of a Plant can easily display it self therein. And therefore in such Generations the Tree which grows in the Earth affords only a place to the Plant which grows upon it. *Plants growing upon other plants.*

Sixtly, 'Tis also very wel known that Plants do grow upon Rocks and Stones, as a kind of Mos doth every where grow upon Stones, and Coral grows out of Sticks upon Rocks in the Sea, and Sea-Mos grows upon Rocks and upon Shell-Fishes. But I doubt whether Corals do grow of their own accord. For although no Body Plants it in the Sea: yet because it is a certain sort of Natural thing, which is no where else Found save on the Rocks of the Sea, (nor can it be said to grow from the Corruption of any other Plant or Animal;) this doubtless is its Natural place, and it was doubtless created upon these Rocks at the first Creation, on which it is propagated, either by Roots or by some juyce containing in it the principles of this Plant. But as to other plants, they grow upon stones, when showers fal upon them, which contain either petty Bodies with the Forms of plants in them, or smal Bodies separated by the corruption of other plants, yet fit to produce plants. And this happens more easily, if upon the Rains any Clay or Earth stick upon the said Stones. For then those Seeds find a more convenient place to display themselves. The same also may happen by the Excrements of Birds falling upon the Stones; since also in those very Excrements the Forms of plants may remain unchanged. But it oft fals out, that not perfect Plants, but only some Mos grows on Stones. For since by Reason of defect of Aliment that same Soul cannot make what it *Plants growing on Rocks. whether Corals grow spontaneously.*

would, it makes what it can, and rather then be out of employment it frames Moss.

And whereas Plants seem to grow sometimes, not only on the surface of Stones, but also to spring out of the depth of them; the cause (doubtless) is, that those Stones have Clifts not discernable by our Eye-sight, into which those petty Bodies or Atomes, containing in them the form of a Plant do insinuate themselves with the Rain, which Form being wakened by the Heat of the Ambient Aire doth at last rouze it self up and fall to work.

And whereas Plants do somtimes grow out of Brick or Stone Walls Joyned with Mortar, Yea, and Shrubs and Trees; it is no wonder. For their Original is the same with Plants that grow out of the Earth, when as either in the Sand which is mixed in the Mortar the Seed of some Plant is mixed, or is brought thither by Birds, or by the force of Winds, and insinuates it self into the chinks of the Walls (which nevertheless is not Spontaneous Generation properly so called) or when with the Excrements of Birds or Rain petty Bodies containing in them the form of Plants are brought thither, and creep into the Chinks, and so in time Sprout forth.

Plants from the tears of plants.

Also *Theophrastus* teaches, *Lib.* 1. *de Causis Plant. Cap.* 4. that Plants do also grow out of the Tears and Gums of Plants. Which Generation although *Licetus* saies it is Spontaneous, *Lib.* 3. *Spont. Viv. Ort. Cap.* 25. yet I had rather hold that this is no Spontaneous Original; since they are produced in a manner of Seeds, and that of the same sort; and *Theophrastus* himself saies, that the Generation from Tears doth plainly answer to that which proceeds from stalks; which questionless is not Spontaneous. And he teaches that there is a fruitful principle in the Tears, when he writes: But that is a most peculiar way of Generation which proceeds from Tears, as that of Horse-smallage, Lillies and some other Plants. Nor is a Reason wanting, but this plainly answers to Stalks. For the tears have in them a fruitful principle, and that is al the cause. And whereas *Licetus* holds a threefold fruitful principle, *viz.* Seed, a bodily part of the plant, as a Root, or stalk, and the Soul, he is out. For he doth ill to ad the Soul, as a different manner of propagation from the others; since all propagation is made by the Soul, and the soul is never propagated without the Body. And whereas he propounds the subjects or Bodies wherein the Soul is, and by which it is propagated, to be the Seed, and Root, and Stalk, he errs therein also. For the Soul may also be in the Tears themselves, which *Julius Cæsar Scaliger* causelesly opposes, when upon the forecited place of *Theophrastus*, he writes, if of a Gum sowed a plant is bred, the Gum cannot be the excrement but must be a part of the plant, wherein there is a vigorous generative principle. For all know that the word Excrement is taken equivocally when it is attributed to the Dung of the Belly, Urin, and other Excrements properly so called, and afterwards to the Seed. But as *Theophrastus* hints, al plants wil not spring from Tears, but only some certain kinds.

Plants from plants of a several sort.

But those plants which spring from plants of a different sort are properly said to grow of themselves. So sundry sorts of Moss do grow upon trees. So Misselto grows upon the Oake, the Hazel, the Apple-Tree, Pear-Tree, plum-tree, Birch-tree, but grows no where by it self. That other Herbs and Shrubs grow upon trees, as hath been said, is not unknown. But that is not Spontaneous Generation; since they grow not out of the Trees, but only upon the Trees, from their own Seeds, and the Tree which sticks in the Earth doth only afford the place; which chiefly comes to pass when some part thereof is putrified and turnd to Earth as it were, whereof we have already spoken.

The four manners of Licetus.

Now *Licetus* propounds four manner of waies whereby plants of a different sort are bred of other plants, *de Spont. Viv. Ort. Lib.* 3. *Cap.* 27. two Spontaneous and two non-Spontaneous. The first he makes to be, when the Soul of an old plant in a matter some waies within it self procreates a new Soul different from it self, which constitutes a new plant of a different sort, and less perfect then it self. The second is, when the seed of any plant doth any waies fall upon another plant. Of which second manner there is no doubt, but the first can hardly be allowed. Nor is it credible that a Soul should procreate another Soul different from it self. More likely it is that the generation of a new and different plant doth proceed from a

subordinate

subordinate form; as hath been said concerning Worms bred out of plants. But that manner is properly Spontaneous.

The Third manner, and that not Spontaneous, he makes to be; when in the chinks and passages of an old Plant the pouder of Animals and Plants containing in it the Soul, as in a Vessel, are by the heat of the Ambient Air disposed to life. But, since those pouders do contain in them a Seminal principle, we have formerly shewed in what sence this generation caused by them is Spontaneous. For Mos doth not belong to this manner of Generation, as he imagins with *Costæus*. For Mos is not made of the poudery matter of Mos cast upon the Trees from elswhere, but out of the barks themselves of Trees when they now begin to be corrupted, as was said before.

The fourth manner is, when sundry Excrements of an old Plant, (the former Soul that had Animated the same being put off by Death, but yet contained in them as in a Vessel) when they come by the heat of the Ambient Air to be digested they are disposed to a new life, and take to themselves again the weakned Soul, degenerating from its old species or sort, so as to become a new vivifying Form, constituting a new Plant.

The generation of Bird-lime.

Peculiarly, as to what concernes the Generation of Missleto, *Julius Cæs. Scaliger* treats largely thereof *Exercit.* 168. where first he relates the Opinion of the Ancients, imagining, that the Berries of Missleto being Eaten by Thrushes, the pulp thereof is concocted; but the Seed comes away indigested with the dung, and fals on the boughs of those Trees whereon the Thrushes are wont to settle. But he conceives this Opinion is therefore to be rejected, because it is not any where planted or sowed, nor grows upon every sort of Tree, nor is it credible the Seed can enter into the hardest boughs so as to cleave the Bark, and become one with them without any Roots; that it proceeds out of some branches where no dung could ever rest nor no Seed stick; nor could he ever find any grains of Missleto in the Crops or Guts of Thrushes, having nourished them with the berries thereof on purpose, and afterward cut them up. But he holds, that as horns (as it were) grow out of the Bones of Animals, so Missleto grows out of Trees, and that the unshaped principles of Missleto being cherished by the inward heat, assisted by the outward, in a Juyce con-natural thereto, it grows into this Plant. And therefore there is one Wood of both, nor is the Missleto inserted into the bough of the Tree like a Pant thrust into the Earth. Which Opinion is so far true, as it holds that the principle of the Missleto is in the Trees on which which it grows, and doth not come from without, but is Generated within the same, and proceeds from superfluous matter, as horns in Animals. Yet herein is a difference, in that Missleto is not bred on all such Trees, as all Animals of the same sort bear horns, but on some Particular Trees only. There must therefore, doubtless, some peculiar disposition concur in some sorts of Trees, and in some Individual Trees of those sorts, by reason of which this superfluous Humor may be generated, which the Soul of the Tree doth afterwards drive into the outward parts, and thereof Generates Missleto. And whereas it may be objected, that because it grows upon Trees of several sorts it cannot proceed from one and the same principle but if it came from the inward Nature of the Tree the Leaves of the Missleto should differ according to the difference of the Tree: to that *Scaliger* answers, that it is not necessary that the Excrements of different Bodies should differ in outward appearance, but it suffices if they be rationally or respectively different, as we see in the Tears of Plants. And although the external face is one and the same, yet the Nature it self is different, and the Missleto of the Oak hath far other Virtues then that of the Apple-Tree. As also Galls are bred on sundry Plants, as shall be anon declared. And this Juyce hath one peculiar property, that though the leaves of the Tree fal off, yet the Missleto keeps his Leaves all the year. *Theophrastus* indeed, in 2. *de Caus. Plant.* writes that Missleto holds its Leaves all the year, upon such Trees as hold their Leaves, but loses them if it grow on Trees that shed their Leaves. But *Scaliger* rightly accuses this of falsity. For every where in the Woods we see Missleto at all times green, upon the Oak, the Apple-Tree, the Birch-Tree, the Bullas-Tree, when those Trees have lost their Leaves. Yet is not this Humor simply superfluous, but either part of the Alimentary or Seminal Juyce of the Tree, which the tree wantonizing (as it were) doth thrust

out:

out: and therefore those Trees on which Mistletoes do grow do for the most part die.

Galls. After the same manner as Mistleto doth grow on divers Trees, so also Gals do grow upon the Oak, the Holme, the Beech; yea and *Scaliger* writes in the forealleadged place that he saw Galls grow upon Sage, of an Ashy colour; and he relates also that Italian Merchants trading to *Aleppo* and other parts of *Asia* informed him, that there is such Apple-bearing Sage to be seen in many parts of *Asia*.

Whether plants breed of Animals. Whether Plants breed of Animals is doubtful. *Licetus* indeed every where affirms that Plants are bred of corrupted Animals. But I scarce think there are any examples to be found of such a thing, and that of the substance of Animals and their Excrements Plants should be generated, as Worms are; unless peradventure the Seeds of Plants, or a Juyce containing in it the Seminal principle of Plants be contained in the Excrements of Animals. And the examples which are brought of Plants bred out of Animals do hardly prove any thing else, then that the Seeds or rudiments of Plants may stick outwardly to the Bodies of Animals, and grow out of them and be augmented. Now Plants are bred either in living Animals or dead ones. As for live Animals, *Aristotle*, in 9. *de Hist. Animal. Cap.* 5. And *Theophrastus*, 2. *de Causs. Plant. Cap.* 23. do relate, that an Hart was caught, with green Ivy growing in his Horns, which (as *Aristotle* wel adds) being accidentally thrust into the tender horn, as it were into a green Tree, became incorporated therwith. Which both *Pliny* confirms, *Lib.* 5. *Cap.* 32. as also *Julius Cæsar Scaliger*, who in his Comment upon that place of *Theophrastus*, writes, that in the budding of his Horns the Hart rubbing them against some Ivy had broken a branch with a Root at it, which fastned it self into some tender part. *Licetus* indeed adds also two other manners, *Lib.* 3. *de Spont. Vivent. Ort. Cap.* 28. The former whereof is, that a dusty matter being blown into the Roots of the Horns near the Hair, and mixt with a various Humor, either proceeding from the Body of the Hart, (in form of sweat or some other Excrement, or from the Air in form of dew or some other matter) did stick unto the Horns, to which poudery matter the form which had long lain therein as in a Vessel being stirred up by the Heat of the Ambient Body doth now adjoyn it self as a quickning and Ivy-making form. The other is this. He holds, that out of the Body it self of the Hart an Excrementitious substance, bred chiefly by eating of Ivy, by the concoctive and expulsive faculty separated and expelled with other Excrements of the third digestion to the Roots of the Horns, and by reason of its own clammines or some other glutinous matter sticking there fast, it is by the ambient heat digested into a new living Plant. But neither of these waies is probable. For as to the former, if so great a quantity of dusty matter might be collected at the Roots of Horns in the Hairs, that therein as in the Earth Ivy might grow, other plants might also grow there. Nor can any reason be shewed, why that poudery Humor gathered at the Roots of the Harts-Horns should be collected only from Ivy. Again, it cannot easily be shewed, how the Soul of the Ivy through so many digestions can arrive safely to the Horns of the Hart; nor can any reason be shewed, why other Plants also should not grow on the Harts-Horns.

How plants grow in Animals

Mos growing on Shel fish and on the Backs of whales. But on the back of Shell-fish and Whales mossie Herbs grow out of the Mud and Scum of the Sea, sticking to the Backs of these Fishes, which contain in them the Seeds or Seminal rudiments of Mos and other Plants. But that other manner added by *Licetus* of Excrements driven from the inner parts of the Beast into the surface is less probable then the former. For it is not credible, that Whales feed upon Mos and Plants. And if this manner were true, other Fishes which are known to feed upon Gras, Mos and Plants, should have mossie Plants growing upon their Backs.

whether plants grow out of the dead Bodies of Animals. Now it is worthy our consideration to examin, whether Plants do grow also out of the Carkasses of Animals. *Licetus* saith they do, and that it is no news, *Lib.* 3. *de Spont. Vivent. Ort. Cap.* 32. But this must be fitly explained. For I cannot beleeve, that as Worms are bred of the very substance of dead Carkasses, so also Plants are Generated of the same substance; nor doth experience confirm the same. Upon the Skuls and Bones of Men Mos is bred. But since it grows not upon such bones as lie under a roof or covering, but on such only as lie in the open Air

Moss bred on the bones of men.

and

and are wet by the Rain, the original thereof is rather to be attributed to the Rain, like that which grows upon Stones. For since, as was said before, the principles of the Seeds of Plants are mixt with Rain, if they fal upon bones, especially such as are Rotten and begin to turn to dust, the said Seminal principle sticking in them and finding matter to work on, and cherished by the Ambient heat, if it do not make other Plants, it will at least generate Mos.

Coral growing on a mans skul.

Some also relate that Coral hath grown in the Sea upon a dead mans Skul. Yet it is impossible that it should grow out of the substance of the Skul: But, questionless, in the Sea some matter having the Rudiments of Coral in it stuck fast to the Skul, out of which afterward the Coral grew.

whether Asparagus do grow upon the horns of a Ram.

It is an old Story that Asparagus grows on Rams-Horns, but Fabulous without doubt; nor doth experience confirm the same. *Fortunius Licetus* indeed, in the place fore alleadged, endeavors to defend it by four Reasons, but all in Vain. For First he saies Plants grow out of Stones, much more may they grow out of Horns. But as was said before Plants grow not out of the very substance of Stones, but of seed or a Seminal matter which sticks to them.

The other is, because Animals are bred of the Carkas of Plants, Namely worms out of Wood, whereas nevertheless the Carkasses of Plants are more imperfect then the Carkasses of Animal. And seeing that it is much easier for a thing to procreate that which is more imperfect then it self, then to act beyond its forces by breeding that which is more perfect: credible therefore it is, that Asparagus may grow upon the Horns of a Ram. But Carkasses do not as the efficient causes breed any thing of themselves, but we must look to the disposition of the matter, and consult with experience, what may be made out of those subordinate forms. Moreover, although Worms are Animals, yet it is a question whether they are more perfect then perfect Plants. Nor doth any reason enforce, that as out of an Animal another Animal though of a different sort may be generated, so also a Plant may be bred thereby.

His Third Reason is, because it hath been observed that in the Sea Coral hath grown out of a dead-mans Skul. If therefore Coral were bred out of a Skul, Asparagus may also grow out of horns. But how Coral may grow upon a Skull, (which notwithstanding is very rare) hath been lately shewed.

Fourthly, Since Ivy hath been found to grow upon the Horns of an Hart; Asparagus may in like manner grow upon a Rams horns. But the case is different. That Ivy did not grow out of the substance of the horns, but the Root of Ivy stuck thereupon, as was said before. And therefore, warily, *Lib. 1. Cap.* 18. he recites indeed the Ancient Opinion, but he makes it not his own, where he writes; 'tis also reported, that Asparagus hath grown upon the horns of Beasts being bruised, and buried in the ground.

whether plants grow out of Metals.

Much less are Plants generated out of Metals, for there is in them no disposition towards the Generation of Plants. And if plants have grown upon Brazen Statues, as *Pliny* reports *Lib.* 17. *Cap.* 25. And *Lib.* 24. *Cap.* 19. that was not caused by the Metal, but the Seminal principle of some plant was by the Rain, or Winds, or birds, or by some other means cast thereupon.

whether the souls of plants and brutes do perish by Death and come to nothing.

Julius Cæs. Scal. Exercit. 307. *Sect.* 29. doth wel complain of the shallowness of Human understanding, as being unable to comprehend the Essences and Forms of substances. And he concludes at last: that it is a part of Mans Wisdom to be contentedly ignorant of some things. Which difficulty and obscurity hath deterred many from making any further search into the Nature of Forms. Whence it comes to pass, that little is to be found (and that of smal solidity) in the writings of Naturalists concerning the Nature of Forms and Souls. But because beautiful things are alwaies difficult; the hardness ought not to discourage us from searching into so noble a subject. And having spoken somwhat in the former part of this Treatise of the Original and Nature of Souls, I shall here undertake the explication of one question of sufficient difficulty and explained by few: *viz.* whether the Souls of plants and brutes when they die do perish and turn to nothing.

whether they perish.

Some deny it, and hold it for an axiom and principle, that Naturally nothing is made of nothing, and again, that somthing doth not turn simply to nothing. And to beleeve it they are perswaded by these Arguments, propounded also by *Scaliger, Exercit.* 307. *Sect.* 14. If saies he, any substance can be so corrupted as to become

come nothing, then on the other side some substance may naturally be made of
1. nothing; First of all because, whatever is created by God that can no Creature
Annihilate, nor can the Creator be compelled, or hindred from that action where-
2. by it is preserved, the withdrawing of which action is Annihilation. Secondly,
Because God did not repent him of his works, but saw that al was good which he
3. had made. Thirdly, Because those Souls and Forms do pertain to the perfection
4. of the universe. Fourthly, Because *Eccleſiaſt. Cap.* 3. *v.* 14. the Preacher saies, I *know*
5. *that all the works which God hath made do endure for ever.* Fiftly, Because many things
which are said to have perished did not indeed perish, as Serpents and Frogs turned to slime are in the spring time regenerated, and live again.

But since these men acknowledg the difference betwixt the rational Soul and the Souls of Plants and Brutes; and do grant that every form besides the rational Soul cannot subsist of it self and by its own power, out of and without the help of the matter; and that they depend upon the matter in their making, being and operation; I cannot see, how they can so simply deny this. Especially since they themselves cannot tel us where these Souls remain after Death. Some say they turn to somwhat which was before and simpler then themselves. But they cannot make out what that former and simpler thing is, nor prove that those Souls were compounded of any thing existing before them; since they are Naturally most simple essence. For if, as *Jul. Cæſ Scaliger* rightly saies *Exercit.* 307. *Sect.* 20. every Soul is the perfection of the Body, and the Act of the matter, and the matter nothing but the four Elements; the Soul must needs be a fift Essence, and that most simple, having nothing before it whereof it could be compounded.

The opinion of the Chymists. Some of the later Chymists, and amongst them *Severinus*, do hold that they go into the *Chaos*, *Orcus*, or *Abyssus*, or Night, (which *Hippocrates* terms *Hades*, *Orpheus* calls Night; *Hermes Trismegistus*, τὸ ἀφανὲς, the invisible Region; as also *Dionysius* the *Areopagite*, in *Eccl. Iustica Hierarchia*, *Cap.* 2. *Apollonius Thyaneus*, *Ousian*, the substance; *Seneca Cap.* 36. Nature; *Servius* upon the 8. of the *Eneids* the Generality) and to their Fountains, from whence at their appointed times taking new bodies they enter again upon the stage of the World. For which opinion they cite a place of *Hippocrates*, *Lib.* 1. *de Diæta*; Whereof we have spoken *in our Book of the Consent and Dissent of the Chymists with* Galen *and* Aristotle. But the Heathens could not explaine what that same *Orcus*, (or Generality of things) is, or where it is; and al these opinions have arose from the ignorance of the Creation of the World, and of the Conservation thereof.

John Marcus Marci. *Johannes Marcus Marci*, in *Defen. Idearum suarum*, *Prefat. Loco Tractat. Premissa*, teaches, that such Forms divided from the society of matter, because they are impassible do need no place. Yet because a finite Essence is necessarily defined to be in some part of an imaginary place, he holds, that it abides in that part of a place where it is separated from its subject, and is neither by it self nor by accident Locally moved. And in Chap. 4 of the same Treatise, he writes that such Souls, the Corporeal number failing, (into which they had degenerated by the fellowship of matter) being freed from Corporeal Laws, they return to the unity of the simple essence in which they were at first created. Yea, he conceives that they are not to perish at the last day, but that the form of this world being passed, they shal not at all be subject to those vicissitudes, nor reassume any Bodies, but passing the time in eternal silence they shall as well as the Elements distinguish and adorne the world with a wonderful variety of Essences, without sensible Figures, the world being no less absolute and perfect then now it is. But these things are only said and not proved, nor do the Reasons before alleadged for this opinion sufficiently prove the same. To which before we make answer, that is to be noted in the first place which *Scaliger* hath, *Exercitat.* 207. *Sect.* 20. All that is (saies he) is either the first principle or proceeding from the first. There is but one first, therefore the rest depend thereupon. Therefore all things, but one, are in their own Nature corruptible For although beings are free from subject and Term; yet are they not free from cause. They are therefore by another and from another. But every thing dependent may be changed by that on which it depends, if it be voluntary. And therefore the immaterial minds themselves, as they depend upon the first Principle, at the Pleasure of the first they may be deposed from that Essence wherein

they

they are placed by him. For if they could not, they must have in them another principle resisting his infinite power. And then he should not be the first principle. But they are not corrupted, because it is not his pleasure.

And *Johannes Serranus* upon the *Timæus* of *Plato*, writes according to *Platos* opinion: God only truly is, and therefore he only is truly eternal, and the Foundation of all created things, all which have this common adjunct, that they had a beginning; yet the Nature of things created is not one, but various and manifold. For some by the pleasure and power of the Work-master have a more firm and constant essence, and therefore compared with other things they have a kind of eternity, given them by favour of the Creator: yet are they not truely eternal; since they did proceed from a certain beginning, and when the Work-master shall please may have an End. For the glorious God is only independent and simply immutable. But all the parts of the World being created by God, as by a voluntary Principle, do depend upon him in their Essence and conservation; or they have their Essence in God, and are preserved by him. But Angels and the Human Soul, inasmuch as they are immortal, they have not their immortality of themselves and their own Nature, but by the Favor of God, by whose power they are preserved. God only hath immortality and immutability communicated from no other: but the Human Soul and Angels have immortality indeed, but communicated from God, by whose Favor and grace it is that they have in themselves no inclination to non-being, but may also be conserved and subsist without matter. Whereof *Damascenus*, *Orthodox. Fid. Lib. 2. Cap. 3. Angelos Athanatos, ou Phusei, alla Chariti*: *an Angel is immortal not by Nature but by Grace.* Now God hath afforded this Grace and Favor, not to all Creatures, but only to Angels and the Human Soul; but all other forms and Souls are so subject to the will of the Creator, or so immersed into this matter, that out of it they cannot be preserved, but their subject perishing they have a natural inclination to not being, and being destitute of their subject they are annihilated.

Out of which it is easie to answer to the Arguments for their opinion who hold, that the Souls of Brutes and Plants cannot be Annihilated. For First, whereas they say, that what ever is created by God cannot by any creature be Annihilated, nor the Creator be hindred from the action of conservation; all that, truly, we grant, but we say withal, that such was the free pleasure of God, that some forms should be immortal, others corruptible; and therefore he is not by any Creature hindred from the act of Conservation, but by his own most free will withdraws the said act, since he would have such to be liable to perpetual Generation and corruption, and would not have individuals perpetual, but that the kinds of things should be perpetuated by reparation of new Individuals. And if it were not so, what difference would there be betwixt the Soul of a man and the Souls of Beasts? And thus not only the Human Soul, but the Souls of brutes and Plants should be immortal. *The former arguments answered.* 1.

Secondly, Although the Souls of Plants and Brutes do perish as soon as an Individual dies: yet God doth not therefore repent of his works. For as God of his own most free Good will created them of nothing, as an Essential being, so he most freely withdrawing his conservation suffers them to return to nothing. 2.

Thirdly, All sorts indeed of things tend to the perfection of the world, and no sort is abolished; but all Individuals are not necessary for the perfection of the world, but there is in them a various Intercourse of Generations and Corruptions. Now the sorts necessary to the worlds perfection may be as well maintained in a few Individuals as in many. And when after the flood there were but a few individual Animals, the world was not more imperfect then now it is. 3.

Fourthly, That Place therefore of *Ecclesiastes* must be understood of the sorts and not of the Individuals of Animals and Plants. 4.

Fiftly, We grant that the forms of Plants and imperfect Animals do not alwaies perish when they are thought so to do, but those that were thought to be abolished do lie hid for a time, and afterwards return to life again, either in their former or in a new shape. 5.

Now this therefore happens, because those forms do not require for their simple being a matter so noble, variously elaborated, and furnished with so many Organs, but can many times lie hid for a Season in some place. But this is not alwaies,

waies, for they also are at last abolished. But in more perfect Animals, where the Seeds if they must be perserved must of necessity be forthwith received into the Womb, the Soul cannot be perserved out of its Body and out of its Seed. And let them shew us but the least sign or token, whereby it may appear that the Soul of a Lyon, an Ox, an Horse, a Dog, did ever live after the Death of the said Animals.

Chap. 8. *Of the Spontaneous Original of Animals.*

Animals which breed of themselves

NOW of Animals that breed of themselves there are sundry kinds. The Weezel lives upon Corn; the Worm *Midas* feeds upon Beans, Trox a Worm so called Eates Pease; There is a Worm which feeds upon the Vine, which *Pliny* calls *Volvox*, *Columella* cals it *Volucra*; the Worm *Cossus* and *Teredo* Eates Wood, especially that of the Pitch-Tree; the Moath Eates Garments, the Worm cal'd *Termes* breeds in Dogs. And there are almost innumerable more of this kind of Worms, whose differences we shal explain by and by, being drawn from the Bodies wherein they breed. Now touching the Generation of little Animals and insects, I could wish more were extant written by others then there is; and I wonder that *Vlysses Aldrovandus* a most Learned man (in that most laborious work concerning Insects) relates many other petty matters concerning them, but mentions very little about their Generation. For although most insects do couple, and bring forth somwhat resembling Eggs; of which see *Aristotle, de Histor. Animal. Lib.* 5. *Cap.* 8. and 19. yet since it is certain that such insects are also Spontaneously generated; the first question is, which were first, those that are Spontaneously Generated, or those which spring from Copulation and Seed. *Austin* toucht this question *Lib.* 1. *de Genesis*, when he wrote: it is a question, whether any of these petty Animals were made at the first Creation, or whether they were a consequent to Creation, or bred of the corruption of Carkasses, and some of the Corruption of Woods and Herbs, and some of the Corruption of fruites. Now this question *Eucherius* answers, *Lib.* 1. *de Genesis*, where he determines that the forms of al things were extant at the beginning, but some Actually, others Potentially. Touching the smalest sorts of Animals (saith he) we must beleeve that whatever of them are bred out of the Waters and the Earth, were made at the first Creation, but the rest that are bred of the corruption and putrefaction of Bodies, Woods or Carkasses, were not then created in *Specie*, but there was present in their Bodies a Seminary original, that in process of time out of their corruptions several kinds might arise. So far *Eucherius*. Wherein he is in the right and thinks the same with us, so that there is no reason that I should be accounted the first Innovator and Broacher of Paradoxes. For we are indeed to beleeve that all petty Animals how smal soever, which are not bred of the corruption of other things, were created and had actual existency at the beginning of the world; but such as now proceed from the corruption of others, they were not made at the first Creation so as actually to exist, but their form was already present in other bodies, although not actually, nor performing the office of a form, but subordinate to the other more noble forms, and affording to them a matter and fit subject. And thus what was before said of the original of live things in general is true also in the original of Spontaneous Animals; and the most Famous Philosophers and Physitians who have diligently weighed the matter have acknowledged that such Animals can by no means proceed from putrefaction, nor yet from that Heat which is joyned to putrefaction. Amongst the Ancients is *Theophrastus*, who *de Causis Plant. Cap.* 13. writes, as in other things putrefying a certain kind of Animal is generated: so in these also (among the rest he speaks of the wild Fig-Tree) there is a certain Animal-making Nature. Which *Jul. Cæs. Scalig.* in *Comment.* approves, and *Ulysses Aldrovandus Lib.* 3. *de Insect. Cap.* 5. confesses, that he likes wel of this Opinion, which holds that there is in Herbs certain principles tending to the Generation of Animals, and that it is fit to explain the mind of many of the ancients. *Eustachius Rudius* consents also with them, who in *Lib.* 2. *Pract. Cap.* 27. concerning the Generation of Worms thus writes: because, (saith he) simple heat being an accident cannot by its own power make a substance and that a living one (for heat in living Creatures nourishes by Virtue of

Whether Spontaneous Animals were made at the first Creation.

The original of spontaneous live things

the

the Soul and of the Aliment begets a ſubſtance) hence it is that this Heat was to be lively and ſtrong, and endued with a vital faculty. Nor ought we to refer this force to the ſimple Intention of heat, as *Galen* did, 3. *Aphoriſm.* 20. who propounds no faculty above heat. For although heat concurs to the production of living things; yet unleſs a ſuperior vital cauſe doth concur, it cannot of it ſelf produce an Animal. And whereas afterward he makes that Cauſe to be the Cœleſtial Bodies, therin he is out; ſince he doth not propound an univocal and proper Cauſe, as was ſaid before in *Chap.* 1. The Opinion of *Thomas Minadous* long ſince a renowned profeſſor in the Univerſity of *Padua* was more true and accurate, who in his Treatiſe *De humani Corporis Turpitudinibus, Lib.* 2. *Cap.* 9. Treating of the Generation of Lice (and the caſe is the ſame with ſuch like petty Animals) thus writes: Here (ſaith he) the underſtanding of man is dimſighted, and dazled at the knowledg of this and ſuch like things, as the Eyes of an Owl at the Sun-light. And a little after when he had related their Opinion who held heat to be the efficient Cauſe, he adds: but on the other ſide, ſince it ſeems impoſſible, that the introduction of a Form and ſhaping of an whole Animal ſhould be the effect of bare heat, but that it depends upon ſome provident action of a certain Artificer working with diſcourſe and prudence; the mind is forced to ſeek out another agent beſides heat, which can moderate all things in the forming of an Animal with Councel and Choice. For heat alone hath never learnt to ſhape an Arm, a Leg, an Eye, with its own ſhape, nor hath it been accuſtomed to uſe the Diſcipline of ſome Maſter; but acting alwaies after the ſame manner converts it ſelf to ſundry things, ſets it ſelf about ſundry formations, according as the builder and Architect of all the parts directs and moves the ſame. Nor doth *Minadous* attribute the generation of perfect Animals alone to a ſuperior power, but of Lice alſo. For although *Galen* conſidering the Generation of Wig-Lice, Lice, Fleas, and the like petty Animals, durſt not aſcribe their Generation to this divine formative faculty, not being able to underſtand, how ſo excellent and noble an agent is able to abaſe himſelf to ſo mean employment, without diminution of his Majeſty: yet he counts it better to conclude, that the ſame mind moderates the generation of theſe petty Animals and thoſe more perfect; and to hold that it is by a common providence the orderer of the ſmalleſt matters, rather then to ſay it is like a ſtepdame, making difference of her Children, ſo as to contemne ſome and leave them only to Fortune and Chance, but to regard others as her own; when as nevertheleſs none of them can be finiſhed and duly accompliſhed without the Providence and Counſel of the Work-Maſter.

Alſo what hath been ſaid before Chap. 4. concerning the final End or uſe of Spontaneous live things, doth belong to this place.

This alſo is to be obſerved in General, of which we ſpake alſo before in Chap. 2. although theſe petty Animals and inſects are generated of the corruption of Plants and Animals: yet moſt of them do afterwards lay Eggs or things reſembling Eggs, whence more of the kind do afterwards ſpring, as ſhall hereafter be ſhewed particularly. *Spontaneouſly bred Animals degenerate*

Now, I think fit to propound the differences of theſe Animals, according to the variety of things from whence they ſpring. In the firſt place, which is to be admired, in the very fire, in the Iſle of *Cyprus*, in the Copper Furnaces, winged petty Animals are generated, a little bigger then our largeſt flies, which fly and leap through the Fire, and die when they are removed therefrom, as *Ariſtotle* 5. *de Hiſtor. Animal. Cap.* 19. Pliny *B.* 11. *Cap.* 36. Seneca *Lib.* 5. *Quæſt. Nat. cap.* 6. *Jul. Cæſ. Scaliger, Exercit.* 23. and other credible witneſſes, yea and ſuch as have ſeen them with their own Eyes do reſtifie. Yet are they not generated in the Fire nor by the Fire. For a pure and ſimple Element cannot produce an Animal. *Fortunius Licetus, Lib.* 3. *de Spontan. Vivent. Ort. cap.* 38. imagines theſe *Pyrauſtæ* or Fire-flies aforeſaid are bred of the Smoak of Wood, eſpecially green Wood, which aſcends from the burning. But ſeeing Wood is burnt every where, and no ſuch Animals are bred, ſave in the Copper furnaces of *Cyprus*, the cauſe muſt needs be proper and peculiar to thoſe furnaces. Now *Ariſtotle* ſeems to point at it, when he writes, that in Copper Furnaces Fire-flies are bred, where the Stone Chalcitis is thrown in and burnt many daies together. Now Copper is molten in *Cyprus* out of its proper Vein or Oare, which *Ariſtotle* here cals a Stone; *Galen* names it ſometimes a Stone, ſometimes Earth, *viz.* becauſe it is hard as a Stone, but crumbly, and *The difference of Spontaneous Animals.* *Flies that live in the Fire.* *Not generated in the Fire.* *where bred.*

when it is burning it rises into bubbles. And therefore without doubt that same stone contains in it some kind of Earth tempered with moisture, in which moisture doubtless the form is, which is afterward actuated by the force of Heat, and being rouzed ingenders this Animal; as in other furnaces and about Bakers Ovens Crickets are engendred of the Morter. And these Fire-flies have a different matter from all other Spontaneous Animals; *viz.* a most dry sooty vapour raised from adust matter and cleaving to the sides of the Furnaces, wherein the form lies hid, which is by the strongest Heat disposed to formation, but dies with cold.

Animals bred out of the Snow.

That Animals are also bred in the Snow *Aristotle* teaches, 5. *de Hist. Anim. Cap.* 19. Yea also, saith he, in those things which can suffer no corruption, we have known Animals to breed, as reddish hairy Worms in old Snow. But in the Snow of *Media* greater and Whiter are found; they are all sluggish and move very hardly. He relates also the same thing in 2. *de Plantis, Cap.* 1. And *Pliny Lib.* 11. *Cap.* 35. writes. In old white Snow Worms are found; in the middest of the Snows thickness reddish (for the Snow it self looks red with Age) hairy, large, and Lazy. And *Olaus Magnus, Lib.* 2. *de Hist. Septentr. reg. cap.* 8. saith thus: in the most vast desarts of *Iseland*, especially under Juniper Trees, and great heaps of Chaff or Straws, although the Sun be in the Scorching sign of *Leo*, there is snow lying, wherein in the Summer time they keep Wine and Beer who desire to drink Luxuriously; but no Body mingles the Snow with his Wine or Beer, because of its Clamminess and Impurity. For Worms and Moths are found in it, just as in Cloaths ill laid up.

Mercurialis indeed, *Lib.* 3. *Variar. Lect. cap.* 4. doth altogether question the truth hereof, because Heat is required for the Generation of Animals which is not in Snow, and because the Snow is wont to kill such petty Animals in the Earth as are wont to hurt the fruits thereof. And if any Worms are seen in Snow, he conceives they came out of the Earth, and so entred into the Snow. But these Reasons are not sufficient to make us reject the testimonies of so many Learned Men. For there is some heat in Snow. Although Snow of its own Nature is exceeding cold, yet it may receive Warmth from the Sun and from the Earth; especially out of the Earth many hot exhalations do arise, which the Snow retains within it Self. And therefore husband men do in the Winter wish for Snow to cover their sowed Lands; because experience hath taught them, that the Corn is sooner hurt by the coldness of the Winter Air if it be not covered with Snow, then when it is so covered; not that the Snow it self doth warm the Corn, but because it keeps in and retains the exhalations which spring out of the Earth, and hinders the coldness of the Air from piercing to the Corn.

How Worms are bred in the Snow.

Now these Worms are bred in the Snow, not as it is simply Snow or Rain congealed with cold, but inasmuch as Pouders, Juyces, or Excrements of Plants or Animals disposed to the production of such Worms are mixed therewith; and then Worms are bred of Snow after the same manner as of Rain, of which we shall speak hereafter. Again the same Exhalations and Atomes may ascend out of the Earth, being ful of them, when it is covered with Snow, and may so be mingled with the Snow. Yea and dust containing in it the Rudiments of such Animals may by the winds be brought from elswhere, and mixed with the Snow; which chiefly happens in Snow that hath lain long. Now this matter which way soever it comes to be mingled with the Snow, when after it comes to be cherished by the Ambient heat, raised partly by the Sun, partly from hot Vapors exhaling out of the Ground, the concealed form displaies it self and produces Worms. Now, this seldom happens in the upper part of the Snow, since the heat exhaling out of the Earth, necessary to excite the Form, doth hardly rise so high, nor can long continue there, seeing it is easily dissipated by the cold Winds.

From Rain, Dew Mists.

It is also wel known to Husband-men, that out of Rain, Dew, and Mists, sundry petty Animals are bred in those Plants which they fal upon; as they often find to their great dammage. For by the Heat of the Sun Vapors out of all kinds of Sublunary Bodies are carried from the Earth up into the Air: wherein there being Atomes containing in them forms disposed to breed such petty Animals, or an Animal-making Nature, as *Theophrastus* calls it; when they are cherished by the Ambient heat, and gain that disposition of matter which is necessary to the performance of operations sundry sorts of Worms are generated. And these Worms are either

generated

generated in the Plants themſelves, *viz.* Trees and Herbs wherefore ſomtimes after Rains, eſpecially thoſe ſmal ſhowers which fal the Sky being clear, and are termed heat drops, and after Miſts and Dew a great quantity of Palmer Worms Caterpillars and ſuch like Creepers are found: or as ſome think, they are found in the Air it ſelf.

Animals falling down with Rain.

For it hath been alſo obſerved that petty Animals have fallen down with Rain. So *Olaus Magnus, de Hiſtor. Septentr. Lib.* 18. *Cap.* 16. writes: Not only in *Norway*, ſaith he, but alſo in *Heſlingia*, and in many other Provinces of the *Dioceſs* of *Upſal* certain ſmal four-footed Creatures called *Lemnars*, of the bigneſs of Mice, with a party coloured Skin, do fall down with the Rain; and it is yet unknown whence they come, whether brought by the Winds from the neighbouring or other remoter Iſlands, or bred rather in the clouds. Yet this is well known, that ſome of them having been cut open as ſoon as they fell down were found to have raw Herbs in their ſtomach, as yet undigeſted. Theſe falling down like Locuſts in Huge quantities deſtroy all green things, and infect whatever they touch with their mouths, and they live till they taſt the Second ſprouting of the Herbs and go away all together, like ſwallows taking their flight; but at a certain ſet time they die in great multitudes, exceedingly infecting the Earth and Air, which becomes peſtilential; whereby men are taken with dizzineſs in their Heads and with the Yellow Jaundize. So far *Olaus Magnus*. But it is ſcarce credible that Animals can be bred in the Air. For ſuppoſe it, that Animals have fallen out of the Air: Yet, it is doubtful whether they were bred there; ſeeing Winds and whirle Winds carry many things from the Earth into the Air which owe their original not to the Air but to the Earth. And ſince there are ſundry winged Animals in the Summer time flying in the Air, if they ſhould be ſurprized with a ſudden thick ſhower, or beaten down with the weight of great drops of Rain, or ſhould be hindred from flying by the wetneſs of their Wings, they might well fall down with the Rain, though they were not Generated in the Air. Nor is it probable that they could be bred in the Air. For, ſince all Animals are heavy, and riſe not up into the Air, unleſs by Leaping or Flying, or except they are detained therein ſome other way; they do by their weight all tend unto the Earth, and reſt themſelves upon the ſurface thereof, and conſequently cannot be generated in the Air. For the ſhaping of parts which accompanies generation ſince it cannot be done in an inſtant, but in proceſs of time, the Animal not yet perfectly ſhaped ſo as to be able to ſuſtain it ſelf by flight cannot be held in the Air, and therefore muſt needs fal down rude and imperfect. And as to that greater Animal called *Lemmar*, *Fortunius Licetus* indeed conceives *Lib.* 3. *de Spont. Vivent. Ortu, Cap.* 40. that it is generated of putrid Clouds, or rather of the Vapors of putrid Carkaſſes carried aloft, and brought into *Norway* by force of Winds. But that Clouds being rare Bodies ſhould ſo putrifie as for Animals to be bred of them; or that vapors from Carkaſſes, (few being drawn up in thoſe cold Countries) ſhould be carried aloft and putrifie in a cold place, and be turned into Animals, is not probable; but likely it is, that in ſome Iſle, or other neighbouring place unknown (as there are many unknown places in thoſe Regions) thoſe Animals were bred, and by force of Winds like Locuſts were brought into *Norway*. Which may be known hereby, that when the ſaid Animals were cut up preſently upon their falling raw Herbs were found in their Stomachs undigeſted, which doubtleſs they had eaten in ſome other place, and not in the Clouds.

Animals are not bred in the Air.

The Lemmer of Norway.

Animals bred in the water.

Experience teaches that ſundry Animals are bred in the Waters, eſpecially in ſtanding Waters. Concerning the Tipulæ or Water-ſpiders that run upon the top of the Water *Ariſtotle* writes, *Lib.* 5. *Hiſtor. Animal. Cap.* 19. Water-Spiders are commonly bred in Wells and Pits, wherever the Water ſtands, and there is an Earthy Muddineſs ſetled in the bottom. Firſt of all the Mud it ſelf putrifying becomes whitiſh, afterwards blackiſh, then Bloody-colord. Whereupon little reddiſh things come out, which for a time cleaving to their original are moved, then they become perfect and move through the Water, being called *Tipulæ*; then a few daies after they rear themſelves on the top of the Water, being hard and immovable; a while after the Shel being broken, a gnat ariſes and ſits thereon, til being moved by the Sun or Wind it falls a flying. Alſo Spiders, and ſundry other petty Animals are found in the Waters in the Summer time.

Water-ſpiders or Tipulæ.

Now,

Animals bred in the Water sundry waies.

Now, Animals are bred in the Waters sundry waies. For some though they seem to be ingendred Spontaneously: yet properly they are not Spontaneous, but are bred of Seed, and by Animals of the same sort, as Frogs. For as Fishes cast their Eggs into the Water, which afterwards become Fishes of the same sort; so Frogs and other like petty Ignoble Animals do shed their Seeds into the Water, which afterwards by the heat of the Sun are cherished and awakened. Moreover of the Juyces and Excrements of Animals and Plants, being corrupted, sundry sorts of Animals are bred in the Waters; which being not of the same sort with those things out of which they are Generated are rightly said to be of Spontaneous original; and they are generated after the same manner as Animals which breed of dead Bodies corrupted, and of Plants.

Animals bred out of the Earth

Many Animals are also bred out of the Earth. But not out of pure Earth, but that which is slimy, and Muddy. That Frogs are bred of the Dust of the Earth moistned by Summer showers, is very well known. And in some places also Frogs grow out of the Earth it self, whereof *Ovid* hath a verse:

The Earth hath Seeds which Generate green Frogs.

Also certain kinds of Fleas are bred out of the Earth in the Summer time, when there is want of Rain, which Eat yong plants, and the Buds of Hops, which the Germans cal *Erdflœhe*, Earth-Flea. Also that Worms are bred in the Earth, especially under dung, is commonly known. But especially after the overflowings of the River *Nilus* sundry sorts of Animals are bred out of the ground, whereof *Ovid* in the 1. of his *Metamorphosis* thus writes:

So, when seven Channeld Nile *forsakes the Plain,*
When ancient Bounds retiring Streams contain,
And late-left Slime æthereal Fervors burn,
Men Various Creatures with the Gleab up turn:
Of those some in their very time of Birth;
Some Lame, and others half alive, half Earth.

Which passage of Ovid *is rarely imitated by the Prince of English Poets and Glory of* London *his Native City,* Edmund Spenser, *in the* 1. Canto *of his* Faery *Queen and the* 21. Stanza, *where our* Thames-Swan *thus Chaunts it:*

As when old Father Nilus *gins to swel*
With timely pride above th' Egyptian Vale,
His fatty Waves do fertil Slime out well,
And over flowe each Plain and lowly Dale:
But when his later Ebb gins to a Vale,
Huge heapes of Mud he leaves, wherein there breed
Ten thousand kinds of Creatures, partly Male,
And partly Female, of his fruitful Seed;
Such Ugly Monstrous shapes elswhere may no man read.

Earth fishes.

That Fishes are dug out of the Earth, even where no Waters are, *Aristotle* tels us, *de admirand. Auscult. cap.* 69, 70, 71. Strabo *in Lib.* 4. Pliny *Lib.* 9. *cap.* 57. also *Theophrastus* in *Lib. de Piscibus*, where he writes: but besides these, there is another thing of a peculiar Nature, and needs to be examined, *viz.* how they are said in *Paphlagonia* to dig Fishes out of the ground in great quantity and very good; which they dig deep out of the Earth where there is no standing water, nor doth any River run through the place, by which (as we said before) Eggs and principles of generation might be brought and left; so that they must needs breed of themselves, and that frequently, for they cannot couple: and if it be true, we must conclude also that that ground is moist and fruitful and fit to engender such Animals; or else that some moisture is brought thither from elswhere, containing in it the principles of Generation; and that the place is fit to receive and nourish the same. For we can hardly think of any other way besides. Also those Fishes are known which our Country-men cal *Peisker*, and some Earth-Weazels, which *George Agricola* describes in his Book of underground Animals Chap. 16. Which are really Earth-Fishes. For in puddlish and Muddy places, where the Summer hath dried up the Water which had been there collected in the Winter, they are dug up out of the Mud.

Mud. And concerning Eeles it is reported, as we read in *Aristotle, Lib.6. de Histor. Animal. Cap.* 16. that they are neither bred by Copulation, nor do breed any Eggs, nor was there ever any Eele caught having any row, Eggs or Seed, or any passage for Seed to come out at; and that in some Muddy Ponds all the Water being let out, and the mud cast away, Eeles have bred again after Rain had fallen. But I cannot beleeve that Eeles have no Seminal principles; seeing they are caught in Rivers, as wel as in Muddy Ponds, 'tis credible those that are taken do leave some Seminal principle behind them, out of which afterwards others are generated: and some conceive that Eeles do grow of the slime, which the former Eeles cast from their outsides, as the Snake casts his Skin. Of which *Scaliger* also writes *Exercit.* 15. Eeles are thought to generate nothing within themselves, but by their mutual twining and twistings one about another they are thought to make a kind of Slime, of which yong ones are generated without. *The Generation of Eeles.*

Oisters also and all Shel-Fish are bred of Slime, concerning which *Opianus*, in his Poem of Fishes, *Lib.* 1. thus writes:

They couple not nor bring forth any young,
But of themselves they breed the Mud among,
As Oisters do, Glib Oisters that no Male
Nor Female have.

Yet some aver that Snailes do also couple, and that they have seen them Joyn together, and sticking one to another, so as to send forth a slimy froth, which after a day or two was changed into the shape of a Snail. Nor is it absurd, that they may be bred both waies, so that when many have been generated Spontaneously, those may afterwrads generate more by Copulation of Male and Female.

Moreover the *Urticæ*, *Purpuræ*, *Ungues* (Plant Animals so called) and all such as stick fast in the Earth, seem to be of Spontaneous Original, and are so accounted by *Licetus Lib.* 3. *de Spont. Vivent. Ort. Cap.* 35. For since they remain fastned to their places, they exercise no Copulation, nor do they seem like Plants to shed any Seed. But this may be doubted of. For although they have no sex, yet they may have Seed, since they are Plant-Animals, and belong partly to Plants, wherein also there is not properly any Sex; and therefore it is not absurd to think they may send forth Seed, which sticking to the Rocks may be formed into a Body like the Generator; which way soever this emission of Seed is caused, whether by Seed properly so called, or by some other thing Analogical to Seed. *Plant-Animals*

And inasmuch as so many Animals are bred out of the Earth, *Aristotle* said very wel, that all things are after a sort ful of Souls. For every where almost smallest Bodies or Petty Atomes are found, severed from the Bodies of Animals, wherein there is a Soul but Latent, and not exercising the second Act or Functions of a Soul. For those more Ignoble Animals do not send forth seed as the perfect Animals do, but a Seminal principle dispersed through their whole Body, as it is in some Plants. And therefore it is no wonder, that the Bodies of such Animals being turned to Dust should be like Seed, and having afterward attained a fitting place should again produce Animals. *Pliny* knew thus much, who *Lib.* 9. *Cap.* 51. writes thus of Frogs: 'Tis strange (saith he) how after six Months time of Life they are turned into Slime and no man perceives it, and in the Spring they are again regenerated in the Water, after the same secret manner, and this happens every year.

Also sundry Animals are bred of Plants, and some of Plants that are yet living, and others of dead Plants: yet every Worm is not bred of every Plant, but certain Worms of certain Plants; as also the same worms do not breed out of all Carkasses of Animals, but some out of one sort, some out of another, and the forms of such insects seem to be subordinate to the forms of Animals and of Plants. Which *Scaliger* also teaches, *Exercit.* 59. *Sect.* 2. and *Exercit.* 190. But which are generated from which, we shall hereafter shew when we come to speak more particularly. Concerning which *Aristotle* hath many excellent things wel worth the reading in 5. *Hist. Animal.* especially in the 19. Chap. Where he teaches in general, that Worms and Caterpillars are bred of Plants, and of them *Chrysalides* Golden-Worms, and of them butter-flies and other Winged Animals are bred. For not only

only Butter-flies, but other winged Animals also are bred of Plants, as Flies, Beetles and such like. Concerning the Spontaneous Original of Flies *Ulysses Aldrovandus* writes, *Lib.* 3. *de Insectis*, *Cap.* 1. some do suppose, that they spring partly from corrupted fruits, and rotten Carkasses of Animals, and partly from the Corruption of the Air, as *Ovid* shews *Lib.* 5. *Metamorphos.* but that their chief matter is Earth. I, as I will not deny but Flies may be generated out of any putrid matter, and out of the Carkasses of Animals, (and I have shewed before that out of the putrifying flesh of other Animals as wel as of Bulls Bees are generated as from the most fitting matter) yet I conceive they are bred for the most part of Plants, and I have observed an example thereof. For when, some years agone, in the Winter time, when no other green Herbs were to be had, I did beat red Cole-worts, and kept them in a stove til they bred Worms, the Worms generated thereof turnd into Golden Caterpillars, which when I had kept shut in a Box, and afterward came to open the same, a troop of smal Flies made their escape, which were bred of the Caterpillars, and broke out of their Crackt Skins.

The Spontaneous Original of Flies.

But to come to Particular sorts; in the first place, truly, 'tis very well known that of Mushroms which are the lowest sort of Plants, Worms are bred. Of the Generation whereof *Fortunius Licetus* disputes *Lib.* 3. *de Spont. Viv. Ort. cap.* 44. and conceives that they cannot be produced by the Soul of the Toad-stool or Mushrom, because it is in the lowest ranke of vegetables and cannot act beyond its power, so as to procreate a sensible Soul more noble then the vegetable. And that also for the same reason the Soul of a Mushrom cannot be changed into a sensitive Soul. But he himself holds that Worms are bred of Mushroms, because in the substance of a Puck-fist, a Toad-stool or Mushrom, many petty Bodies or Atomes are contained, which came from the Bodies of Animals either living or dead, in which Bodies a Portion of the old sensitive Soul doth remain as in a vessel, which the Toad-stool coming to wither, and it having by the heat of the ambient Air attained dispositions necessary to life, it is Spontaneously animated and turns to little Worms. But this opinion of *Licetus* hath been often propounded and examined. In this place, we shall first observe this doubt therein, whether or no those little Worms which are of the kind of Animals are simply more noble then Plants: of which there seems no necessity. For the Creator did not in the first place intend and create those Worms, but the Plants as we shewed before, *cap.* 4. speaking of the final end of these kind of Creatures. Again it hath been often said, that that Hypothesis of *Licetus* will hardly be granted, that the form of nobler Animals should be changed into the form of Ignoble Worms. Moreover Toad-stools are often bred upon Trees, and under Trees in Woods, where it is scarce credible that there hath been any Carkas of an Animal. Yea and they are bred every year. And although peradventure Animals have discharged their Excrements in those places, yet the Soul of an Animal was not in them.

Animals bred of Mushroms

Moreover worms are bred out of sundry perfect plants, whiles are they living. *Pliny Lib.* 13. *cap.* 6. writes, The Turpentine Tree bears certain Bladderkies, out of which certain gnats or other Animals do spring. And *Jul. Cæs. Scalig. Exercit.* 59. *Sect.* 2. nor are these petty Animals bred only in fruites alone, such as Wivels or Wibbles which breed in Wheat, Maggots in Nuts, and other petty Animals in others, of which see *Theophrastus*; but also of the bladders of a Lentisch Tree, which it bears besides its berries, like Cods: so that they seem contrived on purpose by Nature, to be first the Wombs and soon after the Cottages of these smal winged Animals. As in the Cods of Elmes there are bred much such like. And therefore the Arabians are wont to call the Elme the Tree of Wig-Lice, or lowsie Tree. So out of the pith of the Fullers Thistle when it is ripe a smal Worm grows: which *Dioscorides* truly reports to be good against the Quartan Ague. Such Bladders also the Turpentine Tree bears, wherein are a certain Liquor and Gnats. It is exceeding well known that Worms are bred in Hasel-Nuts, Cherries, Apples, and Plums. Upon the Leaves of Oakes little Apples grow like Galls, in which about the beginning of *Autumne*, either a little Worm, or a Fly, or a Spider is found: each of which are thought to be Prognostications of the year following, and that the Worm signifies Plenty, the Fly scarcity, and the Spider Pestilence. On wild Rose bushes hairy Apples grow, called Spunges of Roses, which have a Worm within them.

Worms out of living Plants.

In

In a word, as *Julius Cæs. Scaliger* upon *Theophraſtus* rightly ſaies, every Worm grows in his own Tree or Plant.

The generation of Caterpillars and Butterflies

But eſpecially of living plants ſundry ſorts of Caterpillars and Palmer Worms, and out of them divers kinds of Butter-flies are bred. And *Ulyſſes Aldrovandus* deſcribes near an hundred ſorts of Caterpillars or Palmer Worms, *Lib.* 2. *de Inſect is Cap.* 4. and more then an hundred ſorts of Butter-flies, in the ſame Book Chap. 1. And that which was ſaid before in general is alſo true of Caterpillars, that every ſort grows out of its own Plant. Which alſo *Fabius Columna* confirms by his own experience, *in obſervat. Lib. Minus Cognit. & Rarior. Stirpium addit. Pag.* 87. where he ſaies, that Caterpillars and other petty Animals do not only breed of certain plants, but that a Caterpillar bred of one Plant doth not feed upon another, but only upon its own out of which it was generated: as for example, if a Caterpillar were bred out of a Plant of Rue, it will feed upon other the like Plants of Rue, but not on all that bear the Name of Rue, as Goates Rue and Dogs Rue, by late Authors ſo called, nor on the Leaves of any other Plant unleſs it be of the ſame Nature, and quality. And thoſe that are bred upon the Radiſh will Eat the Leaves of Radiſh, but of no other plant, unleſs peradventure it be a Plant of the ſame kind, as Cole-worts, Rapes, Navews and ſuch like. From which obſervation of the feeding of Caterpillars I conceive a man may know the qualities of the Plants they feed upon. For Silk-worms we know eat the Leaves of Brambles and Mulberries, our People when the Worms are little lay Bramble Leaves upon them for their food, and when they are greater the Leaves of the black Mulberry Tree, which are queſtionleſs of the ſame Nature with the bramble leaves, for they do doth bind and color, as *Dioſcorides* teſtifies: ſo that from the food of theſe Caterpillars and Butter-flies we may know what Plants are of like Nature. For if Caterpillars or Butter-flies feed upon divers Plants of the ſame kind, 'tis Credible they have like Vertues and qualities. So far *Fabius Columna.*

How Caterpillars and Butterflies are Generated

But touching the Generation of Caterpillars and Butter-Flies Authors agree not. *Ariſtotle, Lib.* 9. *de Hiſtor. Animal. cap.* 19. thus writes thereof: Butter-Flies (ſaith he) are bred of Caterpillars; Caterpillars of living Leaves of Plants, eſpecially of the Cole-wort. Firſt of all a ſmal Seed leſs then Millet lies upon the leaf, ſoon after of that Seed ſmal Worms are bred and grow, then within three daies they become ſmal Caterpillars; which being augmented ceaſe moving, and change their ſhape, and are for a ſmal time called *Chryſalides*, as if you would ſay Golden Worms. They are covered with an hard Shel, ſtirring when you touch them, and full of little pores. They have no mouth, nor other member diſcernable. A long time after the Shel being broken, out Flies a parcel of winged Creatures which we call Butter-Flies. And therefore at firſt whiles they are Caterpillars they are nouriſhed by food, and void Excrements. But when they are turned into thoſe *Aureliæ* or Golden-worms, they neither Eat nor void any thing. And concerning the Generation of the Silk-worm, in the ſame place; It is made of a certain large worm, which thruſts out two horns as it were, and is of a kind by it ſelf, which is firſt wholly changed into a Caterpillar, then it becomes a Fly like a Butter-Fly, and afterward it is called *Necydalus.* Which various ſucceſſion of Forms is accompliſhed in the ſpace of ſix Months.

But *Ulyſſes Aldrovandus* in the place fore alleadged diſſents from *Ariſtotle*, and thus he deſcribes the Generation of theſe Creatures: every Butter-fly is bred of the Worm called *Chryſalis* the *Chryſalis* of a Caterpillar, the Caterpillar of the Eggs of Butter-flies; whoſe end is not to breed Caterpillars or Gold-Worms, but other Butter-flies. But he blames *Ariſtotle* for not having obſerved that the ſeed on the leaf was the ſeed of a Butter-fly; and for not underſtanding, that thoſe little Worms which firſt break out of the Eggs are ſmal Caterpillars. But in good deed, although it cannot be denied, that ſome Caterpillars are bred of the Seed of Butter-flies (which I doubt whether *Ariſtotle* were ignorant of) and that the Seed on the Leaves of Plants, leſs then that of Millet, is the Seed of Butter-flies: yet the queſtion now is, whether Butterflies are only bred of Seed, or whether they are not alſo Spontaneouſly generated: ſince certain it is that many Animals Spontaneouſly generated do ſend forth Seed. And experience ſhews that ſuch Worms and Caterpillars are bred out of Dew and Rains falling down upon Plants. For in the ſpring time for the moſt part Caterpillars are thus bred before

Butterflies are seen; and therefore since these Caterpillars come before Butterflies, it is a sign that they are not bred of the Seed of Butterflies, but of corrupted Plants. Which *Aldrovandus* himself was forced to confess, when he relates afterwards, that those Caterpillars which are turned into Butterflies are not all bred of Butterflies Eggs, but some of them of the corruption of Plants. Which experience also doth Testifie, whence it is manifest, that frequently Caterpillars are bred of the corruption of Plants, and of the Caterpillars Butterflies are bred, which bring forth Eggs, out of which again Caterpillars are bred, and of them again Butterflies. In the same place *Aldrovandus* denies that all Butterflies are bred of Caterpillars, but some, he saies, are generated of Worms; and he writes that if Corn be over moist it breeds Worms, which turn to Gold-Worms, and they to Butterflies. He writes also, that he hath seen Butterflies come out of hollow Trees especially Willows, with their Skins wherein they were bred scarce off. But here it is to be inquired, whether or no those Worms were not Caterpillars, which were afterward changed into Gold-worms, and they into Butterflies. Nor are Caterpillars all of one kind, but some are bred of Living Plants, others of Corn, others out of Wood. And those Caterpillars of which Silk-worms are engendred do not retain the same Figure, but change their Coats four several times. Whereof see *Libavius Lib.* 1. *Bombycior.* who hath written most diligently concerning this matter. This is general, that all those little worms which hide themselves in down, or wrap themselves in the Leaves of Trees, after some changes of their outward shapes are changed into a flying Creature, like to that by which the Eggs were laid.

This I have also observed in Caterpillars bred of Indian Water-cresses, which they frequently feed upon, being kept in a Glass; that out of their Bellies live Creatures did come forth, which died soon after, and would questionless revive again the next Spring, and the Caterpillars themselves also died, no Butterflies being of them generated. Wherein I was confirmed by that which *Aldrovandus* relates *Lib.* 4. *de Insectis, Cap.* 1. how that such as have written of the wonders of the new World do report concerning Pismires, how that out of the Body of the dead Parent innumerable little Worms arise, which live after a wonderful manner, until being winged they fly out of their underground Habitations; although the Parents do somtimes bring forth during their Life.

The generation of Gnats. We conceive that Gnats also are bred of the corruption of living, or withered Plants. For although Gnats are generated out of Water and Vinegar: yet that happens, because they contain in them either the parts or Juyces of Plants. For although, as *Aristotle* relates, *de Histor. Animal. Lib.* 5. *Cap.* 19. they are also bred of Water, especially standing Water: yet there is no question but many things are bred therein by the corruption of Plants. And those which are Generated of a sowre Humor *Aristotle* calls *Conopas*; and of them *Pliny* relates, *Lib.* 9. *Cap.* 51. that they are generated of a tart Humor; and *Lib.* 10. *Cap.* 70. that they fly to and feed on sowr things, but care not for what is sweet. Yet they are not immediately Generated of the acid Humor, but of a Worm which is first bred of the said Humor. So that the Original of all these petty flying Animals is from some peculiar kind of Worm.

Gnats generated of a wild fig-tree. More Particularly, Gnats are bred of the wild Fig-Tree, whereof *Aristotle*, 2. *Histor. Animal. Cap.* 32. The wild Fig-Tree generates certain Fig-Gnats out of its Apples; first there is a Worm, soon after the Skin breaks and out Flies a Gnat, and changing its place it goes to the unripe Figs, whereinto insinuating it self it keeps them from falling. *Theophrastus*, 2 *de Caussis Plantarum*, adds that they are bred of the Seeds, a sign whereof is, that after they are fled away there are scarce any Seeds in the Figs. For they fly away maimed, leaving a Feather or a Foot in the Apple. Which *Pliny* comfirms, *Lib.* 17. *Cap.* 27.

A fourfold original of Animals that breed of living Plants. *Fortunius Licetus* holds a fourfold Original of such as spring from living Plants, *Lib.* 3. *de Spont. Vivent. Ortu, Cap.* 46. The first he saies is of the Excrements of Plants. For seeing Plants are nourished by an Earthy Juyce, with which a great quantity of dung and mixt matter is mingled proceeding from the Bodies of Animals living or dead, he holds that there is therein remaining some portion of the former sensitive Soul, and that the said matter

The First

ter is carried for the more abundant nourishment of the Plant to the flours, or Fruites, leaves, or Barks, or elswhere, which when it is digested by the heat of the Ambient Air, and acquires dispositions necessary to life, presently the Soul which lay hid therein doth display it self, and somtimes a Caterpillar, somtimes a Wivel, otherwhiles a Moth, otherwhiles a Worm, somwhiles a Goose, other whiles a Duck is bred, and somtimes another Animal. But this manner is scarce agreeable to reason; especially that Geese and Ducks should be thus bred. For it is not credible that the Souls of such perfect Animals should be able to remain perfect and intire under so many Mutations. Nor doth the sensitive Soul constitute any Animal in its kind; and every Animal, as for example a Lion, an Ox, a Goose, an Hare, hath not only a sensitive Soul but a specifical Soul of its own, differing from the Souls of all other Animals.

The Second manner he makes to be of Atomes, which have flowed from the Bodies of Animals, flying in the Air, and driven into the substance of Plants and sticking thereto by the clamminess of Dew, and being driven within the Porous matter, or the Downy corpulency; which in fit season being digested by the concoctive faculty of the ambient Air, and prepared for another life, they become living Creatures, *viz.* Caterpillars, Spiders, *Canthorides*, Geese and such like Animals. But neither is this manner probable unless it be limited. For that Geese should be generated of Atomes flying in the Air, and sticking to Plants, as it is a thing unheard of, so any one may easily understand that it is impossible. But this we grant, that with the Rain and Dew a matter fals upon Plants, and cleaves to them, out of which Caterpillars are generated, and other such like Insects. Nor do we deny, that Atomes in which the Seeds of such living Creatures do stick may descend with Rain or Dew upon Plants: Yet we do not think that this is alwaies necessary, since the Excrements of Plants and Animals and their corrupted parts have this power, and the Seminal principles of these Animals are fastned upon Plants by the dew and Rain. *The second.*

The Third manner he makes to be, when Atomes or Juyces of the same kind, being any waies slipt out of the Bodies of Animals, and by the Earth communicated to a Plant, are by the heat of the ambient Air awakened and enlivened. Nor yet is it necessary that this should be done, but the parts of Plants themselves if they be corrupted may turn to such petty Animals. And if after this manner Animals should be bred of living Plants, many more would be generated then are: Howbeit certain Animals are nevertheless bred of certain Plants. *The third.*

The fourth manner he makes to be proper to those which are bred in the Water, *viz.* when of the Juyce, Atomes, or Excrements of Plants mingled with the Water, and cleaving to the substance of Plants which grow in the Water, Animals are bred. *The fourth.*

Two manners therefore are altogether sufficient. The First is, when of the corrupted parts of Plants Animals are bred, as of the Barks of Pine Trees corrupted Pine Caterpillars are bred. The other is, when Atomes containing the Forms of such Animals do with the Dew or Rain fall upon Plants; which happens most frequently when few little drops fall as the Sun shines, which we call heat Drops. For with these not only the Leaves of Plants (as it is wel known) are corrupted, but also Husbandmen know, that by this shower little Animals are bred in them. *Two manners of the generation of Animals out of living Plants.*

Animals are also bred of dead and dry Plants; and that Moths, and Wood-Lice, Cos-worms, and sundry sorts of Worms are bred in rotten Wood, every body knows. *Aristotle, Lib. 5. de Hist. Animal. Cap.* 19. writes that the Beetles called Bulls are bred of the Worms which are generated out of dry Wood; and in the same Book, Chap. 32. he relates, that the smallest creature in the world, called *Acari*, is bred not only in old wax, but also in white Wood. *Animals bred of dead plants.*

Among Animals that breed out of rotten Wood, we must reckon that little worm which is called *Xulophthoros*, and which *Arisotle*, 5. *Histor. Animal. Cap.* 32. describes. Which I take to be no other then that which our Germans cal *Stock-wurm* that this Stick-worm, and we in *England*, if I mistake not, call them *Cad worms*, which is bred in the Water of Rotten sticks and Stocks of Trees, being a River VVorm, and taken in the Spring time with River Gudgions. But *Aristotle* seems to have described this Worm, rather when it puts on the Form of a Gold-worm, then when it lives in the Water. The same *Aristotle* *The Cad-worm.*

writes, that he had not yet experimented what Animal was bred thereof. But experience shewes that it is changed into that commonly known insect which *Ulysses Aldrovandus* (2 *de Insectis Cap.* 10.) calls *Perlas*, the *Silesians* term it *Schneider*, those of *Misnia Boltzen*.

Wall-Lice. Whence the *Cimices* Wig-lice or Wall-lice so called are bred, is doubtful. Most are of Opinion they are bred of the filth proceeding from mankind; and *Aristotle*, 5. *de Hist. Animal. Cap.* 31. saies: they are bred of the Humor which is in the upper parts of the Bodies of Animals. But if this were true, why should they not be bred in the Skin, hairs, or Garments of Men and Women, as Lice and Fleas are? And therefore it is more likely, and experience doth witness the same, that they are bred in Bedsteads [*understand Dutch Beadsteads*] and especially in their chinks, and in the Wood of the Walls next the Bed, which is their proper place. And if they are found elswhere in the Straw, or in Garments, they have crept thither from the Bed-steads. Howbeit, there is assistant to their Generation the filth or rather the Vapors of Men and Women sleeping, which sticking to the Wood corrupt the same and cause it to breed these Vermin. Now they are chiefly bred in Wood of the Fir and Poplar Trees. Whereof *Julius Cæs. Scaliger* doth well write (save that he holds they are bred in straw likewise) in *Lib.* 2. *de Plantis*; That certain Woods, as the Fir, and Straws, have in them Natural Rudiments of these Animals.

Concerning the Scotch Geese call'd Brant-Geese.

Hither some refer the Stotch Geese called Barnacles, which some write are bred of rotten Wood. Because Authors Dissent hereabouts, I think here sitting to speak somwhat Particularly thereof. Most, as hath been said, are of Opinion, that they are not bred of Eggs, but in the Sea, out of rotten Wood; although some say in one place some in another. *Munster* saith in the *Islands* call'd *Orcades*, others in *Ireland*, others in *Scotland*, others in the *Islands* called *Hebrides*; some say they breed in any Sea if the Ships be made of Wood which grew in *Scotland*, and therefore some do not ascribe the place of their breeding to one part, but to all that tract betwixt the *Orcades* and *Scotland*, and betwixt the *Hebridæ* and *Ireland*. Moreover, there is a controversie whereof they are bred. For some suppose, that in the *Orcades* upon the Banks of the Rivers there is a Tree which bears a fruit resembling Ducks, which when it is ripe fals off, and if it light upon the water it presently conceives life, and becomes a bird, but if it fall upon the Land it putrifies. Others write that of the pieces of Ship-Masts floating in the Ocean there is first of all somwhat thrust forth, and that afterward at the Sea-weed (or Sea-grass called Wier or Wear) sticking with the pitch to those pieces of wood, there hang little Shel-fish like Cockles or Muscles, which in process of time receive wings and Fly through the Air, or fal into the water and Swim. Others think that these Geese are bred, neither of rotten wood, nor on Trees, but out of Shels. Others conceive they are bred none of these waies, but that they are hatched of Eggs, as other Animals are.

But I think it will be best to set down the Relations of Authors themselves concerning this matter. *Fortunius Licetus* produceth this follwing Account (in *Lib.* 3. *de Spont. Viv. Ort. Cap.* 47.) out of *Turner*. *The former Goose is termed by our countrymen a Brand Goose and a Barnacle; it is less then a wild Goose, on the breast partly black, on the Rest of the Body of an Ash-color. It Flies and cries like wild Geese, frequents standing Waters, and devours standing Corn. The flesh of this kind is somwhat unpleasant, and not in request amongst the Rich. No man ever saw the Nest or Egg of a Barnacle; which is no wonder: because they are without the help of any parent, Spontaneously bred after this manner. When the mast, or some Fir-boards of a Ship have lain Rotting for a time in the Sea, there grows thereout, at first, certain Mushroms as it were; in which in process of time the manifest Forms of Birds are to be seen, which are afterward cloathed with Feathers, and at last quicken and fly. And I would not have any one think that this is a Fable, for besides the common Testimony of all People living upon the Sea-coasts of* England, Scotland *and* Ireland, *that same Famous Historian* Gyraldus, *who hath wrot the History of* Ireland, *(more happily much then could be expected in the Age wherein he lived) doth testifie that Barnacles are Generated no otherwise then as we have said. But counting it not safe to*

beleeve

beleeve vulgar reports, and not crediting Gyraldus *by reason of the Novelty of the matter, while I was ruminating upon this subject whereof I now write, I made enquiry of a certain Iriſh Divine Named* Octavianus, *whom I knew by experience to be a very honeſt and credible Perſon; whether he conceived a man might beleeve* Gyraldus *in this point: whoſe anſwer was (ſwearing by the Goſpel he did profeſs) that what* Gyraldus *had reported concerning the Generation of this Bird was moſt true; and that he had ſeen with his own Eyes, and handled with his hands ſome of theſe fowl before they were come to perfection: and that if I would tarry a month or two longer at* London, *he would ere long cauſe ſome of the imperfect Birds to be brought to me. I am therefore by the credible report of honeſt and learned men who were Eye witneſſes perſwaded, that it is a real truth, that Brand Geeſe or Barnacles, are bred out of the rotten Maſts of Ships, after the manner of Muſhrooms. In Wales, which is a part of* England, *in* Ireland *and* Scotland, *theſe Birds are found up and down upon the Sea-ſhores imperfect and unfeathered, but having the true and proper ſhapes of Birds.*

Hector Boetius *in his deſcription of the Kingdom of* Scotland, *thus writes concerning this matter: It remains (ſaith he) that we ſhould declare what (after long and diligent ſearch into the matter) we certainly know and underſtand concerning the Scottiſh Geeſe which they call Clack-Geeſ, and which are commonly but falſly thought to grow upon Trees in theſe Iſlands. For I conceive that the Virtue which breeds them is rather in the Seas which flow betwixt theſe Iſlands, then in any other thing. For we have ſeen them Generated ſundry waies, but evermore in the Sea. For if you caſt a piece of timber into that Sea, in proceſs of time, there are firſt of all Worms bred, the Wood being hollowed, which by little and little have Heads ſhaped, and then Leggs and Wings, and at laſt are covered with Feathers: Finally growing as large as Geeſe, when they are come to their full ripeneſs of Age they fly in the Air like other fowl, which was evidently ſeen in* Buchphan *by many ſpectators, in the year of our Lord* 1490. *For when as in that Iſland at the Caſtle of* Pechſlege *a great log of this kind of Wood was brought a ſhore by the Sea Waves, thoſe that firſt eſpied it, being aſtoniſhed at the Novelty of the thing, ran to the Lord of that place and acquainted him with the news. He coming cauſed the Log to be ſawed aſunder, which being done, preſently there appeared an huge Multitude, partly of Worms, of which ſome were yet unſhaped, others had ſome members formed; and partly of Birds perfectly ſhaped, of which ſome had Feathers, others had none. Being therefore aſtoniſhed at the ſtrangeneſs of the thing, at the command of the Lord they carry the Log into the Church of* St. Andrew *at* Tyra *(a Village ſo called) where it remains at this day bored through as it were with Worms. The like Log in the* Iſle Taum *was caſt aſhore by the working of the Sea, at the Caſtle of* Bruthe, *two years after, which was ſhewed to many that came running of purpoſe to ſee it. Nor was that any other which two years after the former was ſeen by all the people in* Lethe *a port of* Edin-burge, *For an huge Ship whoſe name and Badge was* St. Chriſtopher, *when it had Lien at Anchor three years together by one of the Hebrides Iſlands, and was brought hither again and laid in Dock, the Beams being eaten aſunder as far as it had lien in the Water, there were ſeen therein a great number, partly of ſuch rude Worms, not yet having their perfect ſhape, and partly of fowls fully perfected. But ſome may cavil and ſay, that there is ſuch a virtue in the Wood of the Trees which grow in thoſe Iſlands: and that the Ship* Chriſtopher *was made of Timber which had grown in the Iſlands* Hebrides: *Therefore I ſhall not think it tedious to ſet down, what I my ſelf ſaw ſeven years ago.* Alexander Gallowid *the Paſtor of Kilkenny, a man beſides his ſingular honeſty incomparably ſtudious after Rarities, having drawn out ſome Sea-weeds, and ſeeing betwixt the ſtalk and the branches, from the bottom to the top, certain Shell-fiſh growing, he was amazed at the Novelty of the thing; but when preſently for his further ſatisfaction he opened the Shells he ſtood much more aſtoniſhed then before. For he found no Fiſh in the Shells, but (ſtrange to tell) a Bird, and according to the bigneſs thereof, he obſerved the Shells to be bigger or leſſer. Wherefore he ſpeeds him to me forthwith, whom he knew of old to be exceedingly deſirous of the knowledg of ſuch things, and acquaints me with the whole buſineſs, being no leſs aſtoniſhed at the ſtrangeneſs of the thing, then delighted with a Spectacle ſo ſtrange and unheard of. Now I conceive it is ſufficiently apparent, that theſe Seeds of breeding theſe fowles are not in the Trunks or Boughes of Trees, but in the Ocean it ſelf, which* Virgil *and* Homer *do not without cauſe term the Parent of things. But when they ſaw that Apples falling from Trees that grew upon the Sea-ſhore, in proceſs of time, the like Birds came out of them, they were brought to conceive*

that

that the Apples were changed into such Birds; but they were mistaken. For in time by the Seas virtue Worms grew to the Apples, and they encreasing, and the Apples rotting by the moisture and vanishing, they through want of good heed imagined that the Apples were turned into these kinds of Fowles. So far Hector Boetius.

The relation of Jul. Cæs. Scaliger.

Julius Cæsar Scaliger, Exercit. 59. Sect. 2. thus writes concerning this matter: You may rather wonder that in the Britannick Ocean, a Bird unknown in your parts hangs by the Beak in the Timber of rotten Ships, till it grow to perfection, and swim away, being fashion'd like a Duck, and living upon Fish. I have also seen one of these Fowls. The Gascoigns inhabiting by the Sea side call them Crabrans, but the Britanies Bearnacles. And a little after: There was brought to the most excellent and great King Francis, a Shelfish as it seemed, not very large, in which there was a young Bird almost perfected, with the tops of the Wings, the Bill and Feet, sticking to the farthest parts of the Shell.

Of P. Pena and M. Lobel.

Petrus Pena, and Matthias Lobelius, In their Observations of Plants, near the end, write thus concerning these Geese. This example of Natures endeavouring to draw some good even out of corruption makes us now willing to beleeve many things which else we should have laughed at, if we had read them in the Historians of the Northern parts of the World. Although they relate the matter somwhat differently, that this is only found in Scotland, or in the Islands of Orcades, anciently conquered by the Roman Navy. But we have not only from Scotland, but here also, in the River Thames where it runs by the City of London, Shells which have been pluckt from the Bottom of an old Ship, with thick rugged stalks. They are very smal, as round in a manner as Cockles, white without, shining, Smooth, as thin and Brittle as Egg shels, opening with two sides like Limpins, of the size of an Almond-Nut compressed: now these hung on the outside of the Belly of a large Ship, upon which being half rotten with Moss and Mud there grew as it were the stalks of Mushroms, resembling the Navil-strings, the ends whereof after the manner of Fruits were inserted into the broad end or Basis of the Cockles, as if the little Birds were thence to draw their life and nourishment, the rudiments of which Birds were to be seen in the upper sides of the Cockles which gaped. These stalks Historians report to grow first out of Worms, which we could not discern, nor do we yet beleeve it to be so: although we know that such kind of Cockles most neatly shaped do grow on pieces of Wood cast up by the working of the Sea. And such of them as fall upon the dry land dye; but such as remain in the Water do hatch a Duck or a Fowle of that kind. The English and Welsh cal them Barnacles; the Scots cal them Clack-Geese, and there are many of them in Scotland, where they are caught, when the standing Waters are frozen with Ice. When we did eat of them, we conceived that they tasted like a Duck, or wild Goose.

Of Michael Mejer.

Among the Germans, Michael Mejer, in his Treatise de Volucri Arborea Chap. 3. himself being an Eye witness relates, that out of Shels like Cockles such Geese are bred, and that he had seen wellnigh an hundred such Cockles, which being opened, there were smal young birds in them, ready as it were to come out of the Egg, with all members necessary to fly with, some of which Birds he had in his own hands. Thus he describes them: if at any time a piece of a Ship-mast smeared with pitch fall into the Sea which runs betwixt the Orcades and Hebrides Islands, and lies there for some considerable time, it grows not only rotten by reason of Worms bred within it, but it is covered all over with Sea-weeds, store of which grow in those parts, and upon any wood that is in the Water, especially if it sweat forth a Pitchy fatness, as the Masts of Ships made of Fir or Pitch-Tree, and abounding naturally with Rosin, and pitched over for the service of the Ship, that the sailes may be swiftly hoised up and let fall, and not stick any where. Now the Sea bears these weeds on the bottom thereof, whence at a certain season it rises up to the top, being as it were pluckt up or cut off, by the Waves. This weed being bred in the Water doth not easily putrifie, having much saltness in it; and therefore in North-Holand, and many other places, they make Dams thereof very strong against the Violence of the Ocean, so as they fetch a remedy from whence the Disease comes. The foresaid pieces of Wood therefore being covered with this weed, which insinuates it self into the smal holes which remain by reason of the rottenness thereof; in process of time, at the other End of the said weed smal Cockles as it were do grow, which are whitish, or of the colour of a Mans Nail, and in shape much resembling the Nail of ones little Finger, and the two Shels being so joyned together, that they stick close, on the upper and more pointed sides they receive the Sea-weeds end, and are firmly

firmly shut on the broader sides, which are afterwards opened, that the fruit being ripe may go out of its own accord to fly. After this manner thousands of smal Shels more or leß do stick, each Shell at the end of a Weed, the other end of the said Weed (as hath been said) being fastned to the pitched Logs of Wood, and that so many in number that the Wood can scarcely be seen: which pieces of Weeds are hardly above twelve Fingers breadths long, and strong, as if they were thongs of Leather. *Somtimes they are certain feet long.*

Carolus Clusius, in *Auctario Exoticorum*, thus writes concerning them: *The Clack-Geese so called by the Scots, which the English cal Barnacles, the Highlanders Rot geese, is a kind of Fowl seen only in the Autumn and the Winter resembling a Duck. The Original of these Fowls being unknown, it came to pass that the common people imagined their first Rudiment to be certain Shells of whitish colour growing to the Trunks or fragments of Wood, which are wont in these parts to be driven on shore by the flowing in of the Sea, where the Wood doth not otherwise Grow, and resembles in some manner the shape of these Birds. But that he ever saw a living and perfect bird come out of those Shells, no man dares averre. So far* Hoierus. *Moreover, these are not the Birds which are commonly thought to grow upon Trees in the* Orcades Isles, *and are called Barnacles, or Rot-Geese; but Birds commonly not leß then a Duck, which I have somtimes seen, yea and tasted of their flesh. And all is found to be fables which hath been reported of them by the* Hollanders, *who some few years since sailed to* Nova Zembla, *and past beyond the Bay of* Nassou, *commonly called* Weygaz. *For they observed those Birds sitting upon their Eggs in the Rocks, and brought many of their Eggs into the Ship, to satisfie their Hunger.* So far *Clusius.* *Of Carolus Clusius.*

Which is confirmed by *Gerhardus de Vera*, of *Amsterdam*, in the Navigation *to* China: *Then rowing,* (saith he) *to the Island which was middlemost, there we found many Eggs of Barnacles (which the Hollanders call Rot-Ganßen or Rot-Geese) and the Fowls themselves sitting in their nests; which being chased away, did cry Rot, Rot, Rot, (whence they have their name of Rot-Geese) and by the throw of a Stone we killed one of them, which we did boyl and Eat, with about threescore Eggs, which we carried with us to the Ship. These Geese or Barnacles were true Rot-Geese, such as in great Quantity do hant every year and are caught about* Weiringen *in* Holland; *which where they laid their Eggs (this man never read* Albertus Magnus) *and hatched their yong, hath been hitherto unknown. Whence it came to pass, that some Authors have dared to write, that they grow out of Trees in* Scotland, *from the branches whereof hanging over the Water, if the fruit fall into the Water yong Geese are thereout generated; but if they fall on the ground, they perish and come not to perfection: which appears now to be false. Nor is it any wonder that it hath been hitherto unknown where these Birds laid their Eggs, since 'tis most certain, that none was ever heard to have come to the eightieth degree of Latitude before, nor was that part of the Country (which I conceive to be* Groenland) *ever known before, much leß were those Geese ever found sitting upon their Eggs.*

Out of all which Narrations it is manifest, that these Geese are not bred out of rotten Wood, but out of certain Shels, which by means of Sea-weed are fastened to the holes of rotten wood, as the foresaid *Mejer* writes. Those Cockles as it were with black Shels are alwaies found sticking to wood lying in the Water, as to the wooden foundations of Bridges, and to Ships sunk under the water. Now they stick to the wood by certain thrids of Hair or Snevil as it were, or else by Sea-weed. And *Mejerus* adds this also in their description, that if the Cockles open themselves, those smal yong Birds appear, like Chickens in their Eggs, which have a Bill, Eyes, Feet, Wings, also the Hairy Rudiments of Feathers. And as they encrease, so their Shells encrease, as it is with all Shel-fish and Snailes. And credible it is, that these Cockles do draw nourishment out of the fat and clammy substance of rotten wood, by those pieces of Grass or Sea-weed, that goes between them, as by Navil-Vessels. And as to the relation of the Hollanders who found these Geese sitting upon Eggs, it may thus be reconciled with the rest, by saying that some were first bred in *England* and *Scotland*, out of the Shels, which might fly to other places: of the number of which were those Geese, which the Hollanders saw upon the Rocks in their Voyage to *Nova Zembla*. For since the greatest part of Insects being Spontaneously bred do afterwards couple and Generate: why may not these Fowls being Animals much more perfect do the same? *The true Opinion concerning these Scottish Geese.*

Now

The Generation of these Scottish Geese.

Now there is nothing of certainty to be found in Authors concerning the Generation of these Geese. The said *Mejer* Cap. 5. attributes the Generation of these kind of Shels and Birds to the Heaven, and conceits they proceed from I know not what imaginative Virtue in the Heaven. But, as we have said elsewhere, the Heaven is only an universal Cause; whereas here our question is about the next and immediate cause. Nor do I conceive that the Generation of these Fowls is Spontaneous, but I conceive they are bred as other Cockles or Shel-fish are.

And if any one shall wonder that a Bird should spring out of a Cockle or Shelfish, let him think with himself that it was as easie for the Creator to make a Cockle bring forth a Bird as another Cockle; and let him consider how many other wonderful things do happen in Nature. Amongst which is that Relation concerning the Lamb which in *Tartaria* grows out of the ground, which *Sigismund* Baron of *Herberstein* (*in Rerum Muscoviticarum Commentariis*) thus describes: *Not far,* (saith he) *from the Caspian Sea, betwixt the Rivers* Volga *and* Jaik, *there dwelt once the Sawolhensian Kings, of whom I shall speak hereafter. Among these Tartarians,* Demetrius Danielis (*as he was counted among the Barbarians, a grave and credible Man*) *told me a wonderful and scarce credible thing; How that his Father being once sent from the Duke of* Muscovia *to the Zawolhensian King; while he was upon this Embassage, he saw a Seed a little greater and rounder then the Seed of a Musk-Melon, but otherwise not unlike the same: out of which being set in the ground there grew up a thing very like a Lamb five hands high, which they called in their speech* Boramez, *or the little Lamb: For it hath an Head, and Eyes, and Ears, and all other parts like a Lamb newly brought forth, also a delicate fine Skin, which many use in that Country to line their Caps withal. He said moreover, that this Plant, (if it may be called a Plant) hath blood indeed, but no flesh: but instead of flesh a substance very like that of the flesh of Crabs. Moreover it had little hoofs, not horny like those of a Lamb, but Cloathed with hairs resembling horn: the Root thereof was at the Navil or the middle Belly. And it lived so long, til having eaten all the grass round about it, the Root it self for want of nourishment withered away. And this Plant was exceeding sweet, so that Wolves and other Ravenous Beasts did exceedingly delight to Eat thereof.* This Relation is confirmed by others. *Fortunius Licetus, Lib. 3. de Spont. Vivent. Ortu, Cap. 45.* hath this Relation out of the Journey of *Odoricus Utinensis* to the great Cham of *Tartary. I write,* (saith he) *a wonderfull thing, not seen by my self, but which hath been told me by very credible persons, who say that in a certain Kingdom there are Mountains called* Capesci, *where grow very great Pompions, which being ripe do open, and therein is found an Animal like a smal Lamb, which hath flesh and the substance of a Pompion together; and although this may seem incredible, yet as there are Trees in* Ireland *which bring forth Birds, so may there in that place be such Pompions as we speak of.* And in another place he reports the same thing saying. *One day I saw a beast, as big as a Lamb, white as Snow, whose Wooll being like Cotton might easily be pulled off from its Skin; the by-standers being asked told me, that it was given by a certain Baron to the great Cham, as the best flesh in the World for a Man to feed upon: and they said withal, that there was a Mountain called* Capsium, *in which there grew great Pompions, which when they are ripe do gape, and put forth such an Animal. Julius Cæsar Scaliger,* approves the same in *Exercit. 181. Sect. 29. The things aforesaid* (quoth he) *are but toies in comparison of that wonderful Tartarean plant.* Zavolla *is a prime Country of* Tartaria *Famous as the seat of their most ancient nobility. In that Country they plant a Seed, very like the Seed of a Melon, but rounder. From whence arise a plant which they cal* Boramez, *or the Lamb. For it grows in the shape of a Lamb, about three foot above the ground, having Feet, Hoofs, Ears, and the whole head like a Lamb, only it is without horns. Instead of horns it hath hair resembling an horn. It hath a very thin skin whereof the inhabitants make Caps to cover their Heads. They say the inner pulp is like the flesh of a Crab, and of an admirable sweetness. A Root grows out of the ground fastned to its Navil. And which makes the wonder greater; as long as any Herbs grow about it, it lives like a Lamb in a good pasture: But when they are consumed it pines away and dies. Which happens not only by chance, and in tract of time, but also when the grass is taken away, for experiment sake. And to encrease the miracle, it is desired by Wolves, but not by any other Beasts which live upon Flesh.* See concerning this thing, *Andreas Libavius, 2. Part. Singular. Exercit. de Agno Vegetabili Scithiæ.*

The Vegetable Lamb of Muscovia.

But

But how Animals should grow out of dried Plants, is a doubtful question. *Fortunius Licetus, Lib. 3. Cap. 48.* doth blame *Jul. Cæsar Scaliger, Exercit. 59. Sect. 2.* for holding that Plants do generate Animals out of themselves, because a living piece of Wood contains only a vegetative Soul, and therefore cannot produce a sensitive Soul more noble then it self, whereby to constitute an Animal, nor change its own Soul into a sensitive. But he himself holds (which is the first manner according to his reckoning) that a Spontaneous Animal is bred out of the Excrements which yet remain in the rotten Wood, together with the Aliment drawn out of the Earth, made up of the dung and Juyces out of the Bodies of sundry Animals; which afterwards from some external agent receives a disposition at last, to put on the Nature of an Animal; and the Soul being present as in a Vessel presently displaies it self, and gives it self thereto, as an Essential and Quickening form.

Animals springing from dried Plants.

Their manner of Generation according to Licetus. First.

But although I leave every mans Opinion free to himself, yet the Opinion of *Scaliger* is more agreeable to truth. For the vegetable Soul doth not produce the Soul of an Animal nor is changed thereinto, but contains under it another Soul of an Animal, which doth belong to the disposition of the matter, which afterwards being set at liberty displaies it self. And therefore *Scaliger* said not absurdly, that Plants contain in them certain Seeds for the Generation of Animals. Nor is it sufficiently proved, that such insects and imperfect Animals are more noble then the noblest Plants; seeing both the Plants themselves have more noble faculties, and are of longer life then such petty Animals; nor were they produced at the beginning of the World by the first intention of the Creator, as other sorts of Living things; but were only bred out of the Corruption of other things. And if the Opinion of *Licetus* were true, a great many more sorts of Animals would be bred of Woods, seeing the Excrements which Plants draw are various, and therefore of the same Wood sundry Animals should be bred; whereas nevertheless only certain Animals are bred of certain Plants.

Afterwards *Licetus* propounds three other manners, according to which Animals are bred out of the Carkasses of plants. The Second manner he makes to be, when Animals are bred of the Carkasses of Plants in the Waters; and that he saith comes to pass, when the Juyces, Excrements or Particles of Animals contained upon any occasion in the Waters, have in themselves (as in a Vessel) some weakned part of the former sensitive Soul, with a small degree of heat, and so cleave to Plants, and sink into them through some pores or Chinks, and being digested by the ambient heat they are prepared for life again, whereupon the Soul as lying hid in the Form begins to be a substantial and quickning Form, and to constitute an Animal. But though it is not to be denied, that sundry Excrements of Animals with their Juyces and parts are contained in the Water, and may there cleave unto Plants: yet if this manner should be allowed, sundry Animals answering to the several forms of Animals should be bred of woods in the waters, which nevertheless is not so. And therefore after this manner also lately declared, I hold that Animals are bred in the Waters out of dry Plants, and that the Water contributes nothing, save that it disposes the dead Plants to putrifaction, and supplies heat necessary to actuate the hidden form.

The second manner.

He makes the Third manner to be, when as out of the water, in the surface of wood, Atomes or Juyces which have flowed from the Bodies of Animals, living or dead, and fly in the Air, do light upon logs of wood, when they are come to a due quantity, and have from the Ambient Air attained a disposition necessary for Life. For then the sensitive Soul which before lay hid in them as in a Vessel, gives it self to them in the Nature of a quickning Form. And thus he holds that Moths, Flies, Worms, and other such Animals, are bred in the rotten boughes of Trees, which touch neither the Earth nor the water. But those little Animals are Generated, not so much out of the woods, as out of the things which did stick to the said woods: and if they are generated of the substance it self of the rotten woods, they belong unto the first manner.

The Third

Finally, He makes the fourth manner to be, when out of the shavings and juyces of Animals shed from their Bodies upon the Earth, and from the Earth some waies thrust into the Bodies of dead Plants, being digested by the ambient heat, and pre-

The fourth

pared for life, an Animal is bred. But this manner seems not much to differ from the Third.

Animals bred of the juyces of Plants. Animals are also bred of the Juyces of Plants; as is seen by Vinegar and Wine, and other Juyces, and *Aristotle* makes mention of wine gnats 5. *Histor. Animal. Cap.* 19. to which also Honey may be referred. For Animals are also bred thereof, especially if bread be mingled therewith. Now *Licetus* makes a twofold original of these Animals, *Lib.* 3. *de Spont. Vivent. Ortu, Cap.* 49. The First is, when in particles long since fallen from the Body of an Animal, and infected with Dung and Onions, and pressed out with Wine or Juyce of Onions and Basil (for of the Juyce of Onions and Basil he conceives Scorpions are bred) some degree of the former Soul remains, which when by the ambient heat it is cherished and disposed to life; the sensitive Soul lying hid as in a Vessel joyns it self thereto as a quickning form, by which the Worms are first Animated. But *Licetus* hath recourse to the same manner, which he never proved, as if it were impossible that an Animal could be bred of other then an Animal; wheras nevertheless experience teacheth, that such Ignoble petty Animals are bred of the matter which in living Plants was the proper subject of the specifick Form of the Plants. And if Animals were bred of Juyces after this manner, not only Flies and Wine gnats would breed out of Wine, but other Animals also; since it is not credible that the forms of Flies only are contained in the dung wherewith Vines are manured. And whereas many things are every where reported by Authors concerning the breeding of Scorpions out of Basil, (concerning which experience must be consulted) it is not credible that all Basil Plants have drawn with their Aliment the particles of Scorpions; since in many places Basil grows, where there are no Scorpions. It is more credible, that since of certain Juyces not any Animals but only a certain sort is bred; the Creator being rather willing that of the Corruption of Plants an Animal should be made, then a putrid Body, hath given to the Bodies of Plants a power for the production of such determinate Forms.

Some Animals generate without Copulation Moreover it is well known, that most Animals are generated by the Copulation of Male and Femal, or of the Seeds of Male and Female Joyned together. Yet it is also observed that some Animals are Generated without the Congress of Male and Female. Female Mice engender of themselves, and thence it is they are so speedily and plentifully generated. So, *Aristotle* 6. *de Histor. Animalium* relates, *Cap.* 37. that a Mouse with young being shut up in a Barrel of Milet, a while after the Vessel being opened, an hundred and twenty yong Mice were found therein. And a little after he writes, that in a part of *Persia*, a Mouse with yong being cut up, the Female Mice in her Belly were found to have yong ones in them: and that there are some who stand stifly in it, that if Mice lick Salt they breed yong without Copulation. So that a man may (not without Reason) doubt, whether that is true which is reported of Mice being bred of rubbish. For since Mice can be so easily generated, if some Mice do but Leap to seek Food out of an old Ship into a new one, they may easily grow to a great multitude. So *Aristotle* tells us that Eels have no Male nor Female 4. *Histor. Animal. Cap.* 11. and that they have neither Seed nor Eggs, but they are generated of a slimy matter coming from the whole surface of the old Eele, as Snakes Skins come from them. And he tells the same thing in 6. *de Histor. Animal. Cap.* 14. and 16.

Female Mice engender of themselves without the Male

Eeles have no Male nor Female

The Seminal principal of some Animals may lie hid in sundry Bodies. From the premises 'tis easie to answer to the objection of some men, who cannot understand how the Seminal matter may lie hid in rubbish, (*viz.* Such as mice are said to be bred of, if so be they are so bred as hath been said) can be of the same specifick Nature with the Seed of the Male and Female, of which they are otherwise generated. For we must observe that in such more Ignoble Animals Generation is not so strictly tied to the Seed of Male and Female, as in perfect Animals, but that one sex alone may also generate. And as some Seeds of Plants can consist and abide even in a base matter, as in Rain: So also the Seminal matter of these Animals can lie hid in rubbish, or other base matter.

The Generation of Animals without sex is not Spontaneous. *Fortunius Licetus* reckons this kind of Generation, when an Animal is bred of another Animal of the same sort, but without Seed, or without the Seed of the Male, to be a Spontaneous Generation, *Lib.* 3. *de Spont. Viv. Ort. Cap.* 50. But I conceive this to be no Spontaneous Generation properly so called. And as the Generation of

of Plants whichhave no sex by their Seed, or by a branch or Root, is therefore termed non-Spontaneous, because it is made by the same sort, and by Seed, or part containing in it the Seminal principle: so also Mice, if they breed Seed in themselves without the Male, or if Eeles are produced out of the slime containing in it the Seminal principle, they are not properly said to be of Spontaneous Original.

A three-fold Original of Spontaneous Animals

Those Animals are more properly said to be Spontaneous, which are generated out of Animals of a different sort. Now this comes to pass three manner of waies. For sometimes petty Animals are generated in Living Animals; and sometimes Animals proceed from the Excrements of Living Animals, and sometimes out of the Bodies of such as are dead. And of such as are bred in live Animals, some are bred in the very substance of the living parts, and some in the Cavities. And because both these kinds proceed from Excrementitious Humors, we shall treat of them together. Hitherto pertain those little Dragons which are bred in the external habit of the Body of such as dwel in the Easterne parts of the world. Of these *P. Æginet*a doth write, *Lib. 4. cap. 59.* In the *Indies* (saith he) and the upper parts of *Egypt*, little Dragons are Generated, or certain Animals resembling Worms, in the Musculous parts of the Body, as in the Arms, Thighs, Legs; and they creep along the sides of Children, under the Skin, so as they are plainly seen to move. Moreover when some reliques of a Dragon have remained long in a place, the place suppurates, and the Skin being opened, the Head thereof comes forth; when it is drawn it causes pain, especially if it be broken off. *Diodorus Siculus* also mentions the same Disease, *Lib. 4. Cap. 3.* and *Straboin Lib. 6.* who writes that this Disease happens to the Ethiopians who are next to the *Silli* who live upon Locusts; and *Plutarch* 8. *Sympos. Quæst. 9.* in these words: those that inhabit about the red Sea, when they are sick (as *Agacharchides* relates) as they are vexed with other unheard of Symptomes; so also with little Snakes, which breed in their Arms and Thighs and put out their Heads to eat the flesh, and being touched enter into the Flesh again, and creeping through the Musculous parts cause intollerable inflammations; which kind of Disease was never heard of before, or since, in any other people. Also *Amatus Lusitanus* treates of this Disease in *Cent. 6. Curat. 64.* [*I have heard here in* England *strange stories of People that have had Wolves in their flesh which they were fain daily to feed with raw beefe. Which I allwaies reckond for Fables. I knew a Woman in* Amsterdam *that pretended one in her brest, but upon visitation I found it an Imposture, to move pity, and that the Meat which was given her to feed the Wolfe she might Eat her self.*

Dragon-worms.

Fortunius Licetus, Lib. de Spont. Viv. Ort. cap. 51. makes the fiery Serpents which God sent amongst the Israelites, *Numb. 21.* to be these kind of Dragons aforesaid, and reprehends *Vallesius*, for that in his *Philosophia Sacra* where he handles such like subjects, he did not observe and signifie as much; and holds that really out of the Bodies of the living Israelites little Serpents and Worms were generated, of so Malignant a Nature that they did cruelly eat their Members, and exceedingly inflamed the same, raising most sharp and burning pains, whence they were called fiery Serpents. But he reproves *Vallesius* without cause, and his Opinion doth not agree with the text of the Bible, from which it is manifestly apparent, that as by the sight of the Brazen Serpent the stinging of those Serpents were cured, so God for to punish the People of *Israel* had sent amongst them such Serpents as did bite them without, but were not bred in their Bodies.

The Serpents sent by God amongst the Israelites in the wilderness were not these little Dragons.

It hath been observed that Worms grow under the Tongue of an Hart, and *Aristotle* saith as much, *2. de Histor. Animal. Cap. 15.* And Hunts-men relate, that mad Dogs have a great Worm in the loose parts under their Tongues, bred of black blood, whereof that Vein is full, which being shut up in a little bag sends Poisonous vapors into the brain and makes the Dogs mad; which Worm being taken out in time prevents their madness. *Pliny* makes mention thereof, *Lib. 29. Cap. 5.* and writes that the Greeks call this Worm *Lytta*.

Worms under the tongue of Harts and Dogs:

That certain Vermine called *Ricini* and *Cynorrhaistæ* or Tykes are bred in the Skins of Dogs, Sheep, Oxen and Harts, is very well known. That Worms are bred in almost all the parts of a Mans Body, I have shewed, in *Lib. 2. Instit. Medic. Part. 3. Sect. 1. Cap. 11.* which happens also in other Animals. For in them are

Ricini or tykes, worms so called:

bred Fleas and Lice.. *Aristotle* makes mention of the Acari. And *Julius Cæsar Scaliger* speaks of an Animal much lesser, *Exercit.* 194. *Sect.* 7. which the *Piceni* cal *Pedicellus*; the *Taurini*, *Scirus*; the *Gascoignes* a *Brigant.* They are vulgarly called *Sirones* or *Chirones.* And he writes that it is wonderful, that they have no express shape, save of a Globe, and that they are scarce discernable by the Eye-sight, and so little that they seem not to be made of Atomes, but to be themselves the Atomes of *Epicurus*; it quarters so under the Skin, that by making holes it breeds a burning pain.

Animals Breed in Animals after a threefold manner, according to Licetus.

As to their Generation, *Licetus* propounds a threefold way and manner, *Lib.* 3. *de Spont. Vivent. Ortu, Cap.* 51. The First is when the Soul of the old Animal begets another Soul in the Excrements contained within the Body subject thereto, not like it self, but much more imperfect; being hindred by the imperfection of the matter; as the Seed of an Horse coupled with an Asse doth not generate the Soul of an Horse, but one of a far inferior Nature, by Reason of the baseness of the matter.

The Second manner he makes to be out of the Excrements separated from the Aliment, wherein (as in a Vessel) there is a portion of the former living Creature from whence the Aliment came. For such Excrements being digested in the Body of the Animal by the heat of the Ambient Bowels, and by digestion having attained dispositions necessary to Life, they come to receive the Latent Soul, in the notion of a quickning form. And after this manner Worms (he saies) are frequently bred in the Belly of Man, out of the Excrements of the first digestion brought thither.

The Third manner he holds to be of Excrements into which by the action of heat the substance of that living thing is turned, in which such Animals are Spontaneously generated, in which Excrements there is yet remaining some portion of the former Soul, as in a Vessel; which when by the digestive heat of the Ambient Air it hath attained dispositions necessary to Life, it gives it self to its subject matter in the Nature of a quickning Soul, which constitutes divers kinds of Animals; for that the former Soul is so impaired as to degenerate into an Essence much more imperfect then it was before. And that after this manner a Serpent may Spontaneously breed in the Womb of a Woman, a Flea or Louse in the Skin of a man, or a Crab-Louse within the pores of the Skin.

But in very deed, as to his first manner of Generation, it is hardly agreeable to truth. For it is not yet proved that one Soul can beget another of a different sort. The forms indeed by the indisposition of the matter are so hindred that they cannot attain their end, so that somtimes Monsters are bred; and that one Soul may put on different Bodies, was said before: but that it may produce another Soul, is not agreeable to truth. Every Soul indeed can multiply it self, not by generating another out of or in the subject matter, but by multiplying it self, by the divine Benediction, and by communicating some of its Essence, without Diminution of its self. Nor doth a Mule Generate, because the Soul of an Horse acting upon the matter of an Ass doth produce the Soul of a Mule, as baser then it self; but the Horse communicates his Soul, which being mixed with the Seed and Soul of the Ass doth not produce an Ass, but a Mule, equally participating of the Nature of an Horse and an Ass.

Also the Second manner cannot take place. Nor when Worms are bred in the Guts, was there a portion of the Soul divided from the Worm; but such was the disposition of the matter, that thereof a Worm might be bred.

Thirdly, In Excrements indeed into which the substance of some part is turned, Worms are bred, as happens somtimes in Ulcers: but who can beleeve that the Soul of a man (for that there is but one Soul in a Man we proved before) should so degenerate as to turn into the Soul of a Worm? And to let pass that question concerning the Soul of a Man; Worms often breed in the Ulcers of Horses, but who will beleeve that the Soul of an Horse is turned into the Soul of a Worm? I hold to that which I have said in my 12. *Chap. de Consens. & Disen. Chymic. cum* Galen. And I have said before in general, that of the matter which is the subject of the specifick Form such Animals are bred; and therefore as that matter is various, so also various Animals are generated, and determinate Animals of such and such matter;

in

in Ulcers Worms, not Lice or Fleas, of the filth of the Skin Lice and Fleas, not Worms. For just as Plants (as *Scaliger* writes, *Exercitat.* 59.) breed Animals, not by putrefaction, but cherishing certain Seeds within themselves; and in *Exercit.* 100. Animals are not bred in putrid Plants, but are the work of the remaining vigor of the said Plants; so is it in Animals: and as he writes in 1. *de Causs. Plant. Cap.* 5. in Spontaneous living things there are certain most secret Seeds.

Animals bred of the Excrements of Animals.

Moreover Animals are bred of the Excrements of Animals of the same sort. *Pliny Lib.* 9. *Cap.* 51. writes concerning Frogs, that they are dissolved into slime, and in the Spring time breed again in the Waters. That dead Flies and Bees revive again, is most known; and of dead Bodies little Animals of the same sort are generated. Concerning Silk-worms it is a noted Case, of which *Hieronymus Vida* in his 1 Book of his Poem of Silk-Worms, hath these Verses:

Go luckie Souls, and in your labors blest,
That die with courage; when you are at rest
Venus of pitty shall new Bodies give,
And you in open Air again shall Live.

And *Paulus Zacchias* writes concerning this matter, *Quæst. Medico-Legal. Lib.* 4. *Tit.* 1. *Quæst. Ult. Also that Worms and Beetles, and many Bodies of Insects, are oftentimes changed, and do many times live again, and take new shapes, any one that will may easily experiment, and the most industrious Physitian* Petrus Castellus *hath a thousand times experimented.* Which it would also become others to experiment, before they did deny things contrary to manifest experience, yea and traduce them as absurdities. This indeed is strange, but experience manifests it to be true. For the more Ignoble Forms are so ordered by Nature, that they can lie hid under matter of a different sort as to external Form, and their Soul can retain its Essence entire without the operations of Life. Where it is to be noted that such insects sometimes do not really die, but only because they are ill disposed they lie as it were dead, exercising no manifest operations: in which manner, Flies lie in cold Chambers as it were dead in the Winter time, but as soon as the Chambers are heated they begin to Fly again. But sometimes they die really, which comes to pass when Frogs are turned into Mud as it were, or such insects are so broken to pieces that there is no more disposition to Life; where nevertheless the Latent Soul having gotten fit matter it shapes it self a Body like the Former.

Some Animals after they are dead revive again:

Fourthly, 'Tis very well known, that Animals of a different sort are bred out of the Carkasses of Animals. That Bees may be generated out of the Carkass of an Heifer *Columella* relates from *Democritus, Magus,* and *Virgil, de Re Rustic. Lib.* 9. *Cap.* 14. That of the Carkass of an Ass drones are bred, and Hornets of the Carkass of a Mule, and Waspes of the Carkass of an Horse, many Authors relate. *Hieronymus Vida* tels us that Silk-worms are bred of the Body of a yong Heifer fed with Mulberry Leaves, *Bombyc. Lib.* 2. And many like things are related, concerning the truth whereof we must consult with experience. Many report that a Toad wil breed of the Carkass of a Duck. And divers give out, that of the marrow of a Mans Body lying in the Grave Serpents are bred, of which the Poet;

Animals of a different sort out of the Carkasses of Animals:

When a Mans Back-bone in the Grave doth Rot
Some think a Snake is of his Marrow got.

And *Pliny, Lib.* 10. *Cap.* 66. reports from many Authors, that a Snake is bred of the marrow of a Mans Back-bone. But this is doubtless Fabulous, nor doth experience confirm the same. *Ovid* writes that Scorpions are bred of Crabs:

From a Land-Crab taking his Clawes away,
If what remains under the Ground you lay,
Out comes a Scorpion with his hooked Tail
Threatning to sting you, if he can prevail.

Concerning

Concerning these things therefore we must consult with experience. For all such Animals are not bred of every Animal; but some of one only, some of another.

How worms are bred of the Bodies of Animals:

Nor doth it follow from our Opinion, as one man cavils, that the Bodies of Serpents, or Serpents themselves, Frogs, Toads, Lizards, do go to the constitution of our Bodies, and that we are actually made up of such things as are destructive to our Natures. For no man ever saw such Creatures bred of the Body of a Man. And although such things have been bred in Mens Bodies, yet have they not been bred of the Body it self, but of vitious matter brought into the Body from elsewhere. Yet is our Body so disposed that some Worms may breed thereof, which nevertheless were not actually in the Body, but that matter had a disposition that Worms might be made thereof. Where nevertheless this is also to be considered, seeing our Body may be considered as in health, and as being sick, we must mark whether these Worms are bred in the Body being sick or in health. And it is most credible that such Worms are bred in Mans Body being sickly, but not as it is found; but rather of vitious Aliment, and Excrementitious Humors, as in *Arabia* the foresaid little Dragons are reported to be bred of Excrementitious Humors in living Bodies; and little Worms breed in the back of Infants, of which we spake before. *Johannes Marci* in his *Idea Idearum Operatric.* makes the cause thereof to be the eating of Locusts. For since those people Eat Locusts frequently (from whence they are termed *Acridophagi*) in proces of time there grows an itching and putrefaction in their members, and their flesh is changed into a kind of insect not unlike a Locust, whereupon they pine away and die. For he writes, that in the Chile and blood, yea and in the flesh it self, strange forms are contained and may be preserved, because in all those Mutations nothing is generated contrary to them. For the latter Form approaching doth not change the whole substance and abolish the former Forms, but takes away only such as are contrary to its own faculties. So, that same subordination of forms must not be stretched too far, nor must we if any thing be bred of the Body of an Animal presently conclude, that it proceeds from the Natural matter thereof; since it may be bred from the Aliment and Excrementitious Humors therein. So I do not conceive, that the Form which shapes the Body of a Silk-worm in the Carkass of an Heifer is a form subordinate to the form of an Ox, but that it lay concealed in the Mulberry leaves, as appears out of these Verses of *Hieronymus Vida*, in the 2. Book of his Poem of Silk-worms.

But if your stock of Silkworms should decay,
And all your Seed should chance to die away,
By wrath of Jove: *As Bees they say are bred*
From Heifers Body, kil'd and buried;
From the same Body, only with more care,
Your missed Silk-worms Generated are.
For twice ten daies, and twice ten Nights, at first
Keep her from Graß, nor let her quench her thirst
With any Water. But in Stable shut
Mulberry Twigs and Leaves see that you put
Into the Crib: no other Meat or Drink;
Then kill and let her Carkaß Rot and stink:
When lo a Lusty swarme of Silk-worms smal
Out of her Sides and Back you'll see to Crawle.

The manner of Generation is the same, which we have formerly declared concerning Plants.

The difference of Spontaneous Animals.

Now this is also to be noted, that there is some difference betwixt Spontaneous Animals. For some are altogether base, which generate nothing, as the Wine Gnats and such like Worms; other somwhat more perfect do not Generate living yong ones, but produce little Worms, or somwhat like an Egg in Nature, out of which afterwards petty Animals of the same sort are Generated. So Flies engender little Worms, which grow to be Flies; which also *Julius Cæsar Scaliger* observed, as he relates, *Exercit.* 191. *Sect.* 2. Lice breed Nits, which also turn to Lice; although some

some falsly deny the same; as we have shewed in our *Tract de morb. Infant. Part.* 2. *Cap.* 5. *de Phthiriasi.* Others produce Animals of their own sort, as is wel known of Mice; provided it be certain that they are Spontaneously generated. And truly I conceive there are few Animals Spontaneously Generated, which do not afterwards generate such as themselves. *Aristotle* in *Lib.* 5. *de Hist. Animal. Cap.* 19. tels us that Glow-worms are Generated out of a certain kind of hairy Palmer-worms. Yet *Fabius Columna* relates, in *Observ. Lib. min. Cognit. et Rar. Stirp. Addit.* that *Carolus Vintimillias* the *Panormitan* observed in *Sicily*, that Glow-worms are some Male and some Female. For keeping divers naked ones in a Glass for his pleasure, and delighting to see them shine in the night, (for which cause he fed them with moistned bread) as he was at Supper, a winged one came flying about the Candle, which he caused to be caught and put into the Glass unto the rest, which presently (he looking on) one Trod one of them and stuck to her, as the Silk-worm is wont to do, and being Pluckt from her he Trod another and another: and the day following they laid their Eggs, resembling Milet Seed in shape and color. *Glow-worms do couple.*

This only we shall add by way of Conclusion, that we conceive *Aristotle* to have been in the right when he wrote, *that all things in some sort are ful of Souls.* Which though they do not allwaies Animate and inform the things wherein they are, no nor act at all, yet they lie concealed in them; and when they find their time and have gained fit matter they display their forces. And therefore again, *Julius Cæsar Scaliger* did wel write, in 1 *de Plantis*, that there are most secretly hidden Seeds of Spontaneous live things. And therefore, if we list to speak accurately, nothing can properly be said to be Spontaneously generated; but every thing is bred of its own Seed, though hidden and not discernable by our senses, or at least of a principle answering to Seed. And this is all the difference betwixt Spontaneous things and non-Spontaneous, that the latter have a manifest Seed, the former an hidden secret Seed, or somwhat equivalent thereto. For we list not here to contend about words. Only this must be remembred, that those things which are said to be Spontaneously generated do not proceed from an external equivocal agent, but from an internal principle; which if any man will cal Seed, or a Seminal principle, or somwhat answering to Seed, he shall have my Consent. For although *Licetus*, *Lib.* 4. *de Spont. Viv. Ort. Cap.* 2. denies that all things have their Seeds: yet there he grants, that those things which are said to be of Spontaneous original have somwhat answering to Seed. Now the manner of their Generation is this; as an Animal is said to nourish and augment it self, whiles the common principle and first cause of nutrition and augmentation communicates it self to the assimilated Aliment, and insinuates it self thereinto, but doth not make a Soul like it self in the Aliment: so the Spontaneous original of live things is effected, whiles the agent lying hid within the matter, and not yet manifestly performing the operations of a Soul, having gained a matter rightly fitted and disposed, communicates it self therto, and begins to perform therein the operations proper to it self, and to exercise the function of a Soul, but doth not produce another Soul in the matter. *All things ful of souls*

The Conclusion.

And so much shall suffice to have spoken (though but briefly) of a most exceeding hard and obscure subject. It had been easie to have discoursed more largely of more sorts of Spontaneous living things: but my purpose is not in this place to write a natural History, but only to propound the manner of the original of Spontaneous living things, and to declare the same by certain examples. And although I know many things may be objected against that manner of the Generation of these things which seems to me most probable: yet this I know withall, that it is easier to oppose the truth then to declare the same; and that a right line is the measure of it self and a crooked line too; and who ever shall rightly discern the truth may easily answer all objections, of which a thousand may be invented.

Nevertheless

Nevertheless if any thing obscure and doubtful shall occur in an Argument handled by few Authors, it is not fit to reject or condemne the same, before somwhat better shall be substituted in the place thereof. And therefore, friendly Reader,

If ought thou know'st, which is then this more true,
Write it; if not, Use this: and so Adieu.

SUch is the Acuteness and Solidity of this Excellent Philosophical Treatise, wherein our learned Author hath in my Opinion performed his Master piece, that he and the Englisher thereof may well say in the words of *Ovid*:

And now the work is ended, which Joves rage
Nor Fire nor Sword shall raze, nor Eating Age.
Come when it will my deaths uncertain houre,
Which of this Body only hath a power:
Yet shall my better part transcend the Skie
And my immortal name shall never die.
For whereseere the British Peoples spred
Their conquering Arms, I shall of all be Read.

FINIS.

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Being the whol

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The LIFE of
DANIEL SENNERTUS,
Doctor of Physick.

DAniel Sennertus *was born at* Uratislaw *the chief City of* Silesia, *in the Year of Christ*, 1572. *on the* 25. *day of* November, *about the time of Sun-set. His Father was* Nicholas Sennertus, *a* Shoo-maker, *born at* Lehnen *in* Silesia, *and Free-man of the City of* Uratislaw, *a good honest man, and respected amongst his fellow Citizens. His Mother was* Katherine Helman *born in the Town of* Zotten *at the Foot of the Mountain* Zaboth *or* Zoten, *whence the Town hath its well-known name. And it being his Fathers hap to die in the Yeer* 1585. *on the eigth day of* April, *about the Eightieth Yeer of his Age; his Mother was as careful as a Woman could possibly be, to have him trained up in Piety and good Literature. To both which (by the Goodness of God) he had such a Natural Inclination, that he hardly ever stood in need of any body to provoke and incite him thereunto, nor did he ever make use of any private Master, but by the advice of Friends (with whom his careful Mother consulted) he wholly devoted himself to the study thereof. And when he had made so great a progress in the Schools of that City wherein he was born, that he was now fit for the University (as his Masters judged) he went to the University of* VVittenberge, *in the Yeer* 1593. *on the sixt day of the Month of* July. *And because he then entertained no high Hopes nor Ambitions, but his only Aim was to gain a School-Masters Place in the City wherein he was born; therefore in his first Yeers spent in this University, he chiefly busied himself in the studies of Phylosophy, in which by the Blessing of God he so thrived, that in the Yeer* 1598. *on the third day of* April, *he was made Master of Arts, holding the fourth place of Seniority and Dignity amongst fifty eight that Commenced with him. But notwithstanding, coming by divers Circumstances to understand that God had designed him to some other Imployment, he joyned the study of Physick to his study of Philosophy, and afterwards applied himself wholly thereunto, and so handled the same that he gained the Love of his Fellow Students, and the Favors and Good-will of*

his Instructers in that Faculty. And although he well-nigh finished the Course of his Studies at VVittemberge; *yet he visited the Universities of* Lipsia, Jene, *and* Francfort *upon* Odera. *And when at lengh his Age and other considerations did advise him so to order his Affairs that some Fruit might redound from his Studies both to himself and others, he went to* Beroline (*where the Electors of* Brandenburge *keep their Court*) *in the Yeer*, 1601. *that he might there observe the Practice of the most expert Physitians. And from thence he intended to go to the Universty of* Basil *that he might there Commence* Doctor of Physick, *minding afterwards to return into his Country to practice the same. But whiles he was writing his Disputation which he intended to hold at* Basil *for his Degree, a Messenger comes from* VVittemberge, *and brings him a Letter from* Tobias Knoblock, *intimating that he and some others were intended to Commence Doctors there, and desiring to know if he would make one amongst them. Being doubtful therefore what to do, whether he should proceed to* Basil, *or return to* VVittemberge, *he asked Advice of his most intimate Friend, Dr.* George Magnus, *who advised him to return to* Wittemberge, *saying withal,* * Who knows what good may come on't? *Whereupon (taking the Speech of his Friend for the Voyce of God) he returned to* Wittemberge, *and (with these following Competitors, Mr.* Balthazar Schultzius, *Physitian to the Dutchie of* Pomerland, *and the Common-wealth of* Colberge, *Mr.* George Belser *of* Ulme, *then Professor of Natural Philosophy at* Eilenberge, *and afterwards prime Physitian to the Prince Elector of* Saxony, Tobias Knoblochius *of* Bretaigne *in* France, *afterwards Physitian to the Prince and Common-wealth of* Onold) *he Disputed for his Degree on the third of* July, *in the Yeer* 1601. *and upon the tenth of* September *in the same Yeer, he was with them created* Doctor of Physick *by the Colledg of Physitians of that Universty. And although then also he was thinking to return into his Country; yet that same Prediction of his Friend appeared not to be vain. For Doctor* Johannes Jessenius *being then about to leave the Professorship of Physick, not only some of the Professors did put him upon it to seek the gaining of the said* Jessenius *his vacant Place; but Doctor* Jessenius *himself also in his Letter of the sixteenth of* June, 1602 *whereby he resigned his* Place *to the Prince Elector, commends him as a man of an hundred for ability to undergo that Function which was a burden too heavy for ordinary shoulders. Wherefore following their Advice, he wrote a Letter to the Colledg of Physitians presenting his Service unto them, and he did easily obtain, not only to be nominated by the Colledg of Physitians and Universty, but to be confirmed in the place of Professor by the* Prince Elector of Saxony, Christian, *the second of that Name, and upon the fifteenth day of* September, 1602. *he was received into the Colledg of Physitians. In*

* *Wer weiß wozu es gut seyn möchte*

See at the beginning of the Judgments of Learned Men.

which

which Place *by the blessing of God, to whose Name be the Glory, he so carried himself that all his care was faithfully to discharge the Office committed to him: and his Diligence in teaching was rewarded by the Gratitude of the yong Students his Disciples. Nor did he think himself sufficiently discharged of his Duty, if he did not neglect his publick Lectures, but he labored withal to advance the Art of Healing by his Writings. Wherein how he hath acquitted himself appears from the following Testimonies and Judgments of most renowned men. He was the first that brought the Practice of Chymistry into the University of* Wittemberge, *concerning which Art, though the Judgments of men are various, and true it is, that the abuse thereof is now adaies as great as the use well-neer. Yet it is well known that no man can wholly reject the same, save he that is altogether unacquainted therewith. Also in the Practice of Physick he did all his endeavor to help many, and hurt none. Hence it came to pass by Gods blessing, that not only at* Wittemberg, *but from other* Parts *also, his Advice was sought by many sick people, both high and low, rich and poor. To all which he was most ready and willing to afford his Advice and Pains, even with the neglect of his own Health: nor did he ever refuse his helping hand to any one. He never required any price of any one for his pains, but whatever was presented to him he received it with thanks, and he passed by without offence the Ingratitude of many of his Patients, yea, and to poor people he restored what they presented him by way of acknowledgment. What danger he underwent from the Yeer* 1602. *to the day of his death, in which time the Plague was in the City seven times and more, very brief, besides other contagious Diseases which frequently crept up and down, his unexpected and sudden Death did at last declare. In which pestilential and sickly seasons he never stirred out of the Town, although he was at liberty so to do, having no obligation upon him to the contrary. In the Year* 1628. *on the* 28. *day of* March, *attending upon the* Prince Elector *of* Saxony, *being sick of a pestilential Feaver, he was unexpectedly by him made one of his Physitians in Ordinary, he leaving it free for him to continue in his* Place *at* Wittemberge. *He was also most frequently sought unto and advised with by many other Dukes,* Princes, *Earls, and Nobles, especially of lower* Saxony, *and upper* Germany, *who all by the Grace of God found good by his Advice and Help. Nor must it be here omitted, how by the advice of the* Physitians *of* Padua, *the most illustrious Lord* Nicholaus Sapieha, *Earl of* Coden, *chief Ensign-Bearer of the great Dukedom of* Lituania, *being troubled with a desperate kind of Disease, came out of* Poland *to* Wittenberge, *above an Hundred German Miles, and received Help by the Advice of* Sennertus.

* See his Letter among the Judgments of famous Men.

He was many times Dean of the Colledg of Physitians, and six times publickly created Rector of the University, a thing never known before.

He

He had three Wives, but Children only by his first Wife Margaret, *Daughter of the most excellent and renowned* Andreas Schaton, *Doctor and Professor of Physick, and Senior of the same Colledg at* Wittemberg: *By her he had seven Children, whereof three are only yet alive, two Sons and one Daughter, viz.* Andrew *and* Melchior, *the former Doctor of Divinity, and the latter Doctor of* Physick; *and* Margaret *the Wife of Dr.* Laurence Pope, *Physitian to the Prince Elector of* Saxony. *The rest of his Children died in their Infancy, or before they were well come out of Boyes Age, excepting* Daniel *his eldest Son, who being twenty eight yeers of Age, died at* Padua *where he studied Physick. But this his Father (of whom we speak) ended his daies, and rested quietly in Christ the* 21. *of* July, *in the Yeer* 1637. *at which very time the Pestilence was also rife, whereof he died. He was three score and five yeers old when he died. He was buried in the* Tower Church, *or the Church of the* University. *There his Tomb-stone is to be seen with this Inscription graven thereupon.*

The Inscription of the Tomb-stone.

D. O. M. S.

THOU THAT CANST TREAD UPON THIS SACRED EARTH, STOP TILL THOU READEST WHAT THE STONE WILL SAY.

HERE LIES

DANIEL SENNERTUS,
A SILESIAN OF URATISLAW:

WHO IN TEACHING AND PRACTISING THE ART OF HEALING XXXV. YEARS, WAS AS IT WERE THE ORACLE OF HEALTH: AND THEREFORE BEING MADE ONE OF THE CHIEF PHYSITIANS TO THE PRINCE ELECTOR, HE ATCHIEVED THE TOP-CHAIR OF PREFERMENT BY HIS VERTUES.

HE WAS BORN THE XXV. OF NOVEMBER 1572. AND DIED THE XXI. OF JULY 1637. BUT ETERNALLY SURVIVES IN THAT GLORY AND RENOWN, WHICH LIVING, BY THE ILLUSTRIOUS MONUMENTS OF HIS MIND, WIT, AND UNWEARIED INDUSTRY, HE GAINED TO HIMSELF THROUGHOUT EUROPE, AND WHEREWITH HE DID ILLUSTRATE THIS UNIVERSITY.

THE SURVIVING ORPHANS TO THEIR INCOMPARABLE AND INDULGENT FATHER, HAVE IN PIETY REARED THIS MONUMENT.

THE CONTENTS OF THE Art of Chirurgery, Explained in SIX PARTS.

PART I.
Of Tumors.

Page

CHAP. 1. *Of the Nature, Causes, and Differences of Tumors.* 2401
Chap. 2. *Of Tumors arising from Humors in general.* 2407
Chap. 3. *Of Impostumes.* 2411
Chap. 4. *Of extream Corpulency, or over-much fleshing.* 2416
Chap. 5. *Of an Inflammation.* 2420
Chap. 6. *Of the* Sinus *in the Tumor.* 2441
Chap. 7. *Of the Tumor* Erysipelas *or* Rosa. 2445
Chap. 8. *Of a* Bubo. 2446
Chap. 9. *Of the Tumor* Furunculus. 2448
Chap. 10. *Of the Tumor* Phyma. 2449
Chap. 11. *Of the Tumor* Phygethlon. 2450
Chap. 12. *Of the Tumor* Parotis. ibid.
Chap. 13. *Of a Carbuncle.* 2453
Chap. 14. *Of the Tumor* Paronychia. 2459
Chap. 15. *Of Perniones or Kibes.* 2460
Chap. 16. *Of the Tumor* Ecchymoma. 2462
Chap. 17. *Of the Tumor* Herpes 2467
Chap. 18. *Of the Tumor* Oedema 2470
Chap. 19. *Of a* Scirrhus. 2473
Chap. 20. *Of a Cancer* 2476
Chap. 21. *Of a Watry Tumor* 2481
Chap. 22. *Of* Exanchemata, Ecchymata, Papulæ, Pustulæ, Phlyctenæ, *and* Eczesmata. 2482

Page
Chap. 23. *Of* Vari *or Pimples.* 2484
Chap. 24. *Of* Sudamina, *and* Sirones. 2485
Chap. 25. *Of* Epinyctides, *and* Terminthi. 2486
Chap. 26. *Of* Effere. 2487
Chap. 27. *Of* Scabies, *or Scabiness.* 2488
Chap. 28. *Of* Lepra *of the Greeks.* 2495
Chap. 29. *Of* Vitiligo, *or* Leuce, *and* Alphus. 2497
Chap. 30. *Of the Tumors,* Impetigo, *and* Lichen. 2500
Chap. 31. *Of* Gutta Rosacea. 2502
Chap. 32. *Of Crusta Lactea, Achores, Favi, Tinea, Ficus, Helcydrium, Psydracia, and Phthiriasis.* 2504
Chap. 33. *Of* Strumæ, *and* Scrofulæ. 2506
Chap. 34. *Of* Ganglium, *and* Nodi. 2507
Chap. 35. *Of* Meliceris, Atheroma, *and* Steatoma 2510
Chap. 36. *Of* Testudo, Talpa *or* Topinaria, *and* Natta 2513
Chap. 37. *Of* Verrucæ *or Warts.* 2514
Chap. 38. *Of* Cornua 2517
Chap. 39. *Of* Fungi 2518
Chap. 40. *Of Tumors Malignant and Poysonous, and in special of* Elephantiasis. 2520
Chap. 41. *Of a flatulent or windy Tumor.* 2527
Chap. 42. *Of Tumors proceeding from the solid parts falling down into, or resting upon some other parts, in general,* 2528
Chap. 43. *Of* Aneurysma 2529

Chap. 44. *Of the swoln Veins, called* Varices 2533
Chap. 45. *Of the* Elephantiasis *of the Arabians* 2537
Chap. 46. *Of Particular Tumors* 2538

PART II.
Of Ulcers.

Chap. 1. *Of the Nature and Differences of an Ulcer* 2544
Chap. 2. *Of a simple, or single Ulcer.* 2546
Chap. 3. *Of an Ulcer with a Distemper.* 2553
Chap 4. *Of an Ulcer with the afflux of Humors* 2556
Chap. 5. *Of the* Sordid, Putrid, *and* Corroding *Ulcer* 2557
Chap. 6. *Of an Ulcer with Tumors.* 2559
Chap. 7. *Of proud flesh growing forth in Ulcers* 2560
Chap. 8. *Of an Ulcer that is wan, and Callus* ibid.
Chap. 9. *Of Ulcers that are hallowed and furrowed.* 2561
Chap. 10. *Of Fistula's* 2563
Chap. 11. *Of an Ulcer, with Vermine, or Worms breeding therein.* 2568
Chap. 12. *Of a Varicose Ulcer* ibid.
Chap. 13. *Of an Ulcer with the rottenness of a Bone.* 2569
Chap. 14. *Of Ulcers hard to be cured, commonly called* Cacoethe, Telephium, *and* Chironium 2572
Chap. 15 *Of the Ulcer* Phagedæna 2574
Chap. 16 *Of an Ulcer with pain* 2576
Chap. 17 *Of the Ulcers of the Legs, and other particular Ulcers* ibid.
Chap. 18 *Of Burnings* 2577
Chap. 19 *Of a Gangrene and* Sphacelus 2584

PART III.
Of the Vices of the Skin, Hair, and Nails.

SECT. I.
Of the Vices of the Skin.

Chap. 1. *Of the color of the Skin changed, (in general) and in special touching that blackness that is contracted from the Sun* 2598
Chap. 2 *Of the* Ephelides *in Women with Child* 2600
Chap. 3 *Of* Lentigines, *Pimples, or specks in the Face* ibid.
Chap. 4 *Of Cosmetical, or Beautifying Medicaments* 2601
Chap. 5 *Of those they cal Mother Spots, or Blemishes* 2604
Chap. 6 *Of the Volatick, or flitting spots of Infants* 2605
Chap. 7 *Of the spots and blemishes that the Germans cal Hepatick, or Liver-spots* ibid.
Chap. 8 *Of the Itch* 2606
Chap. 9. *Of the ill and offensive Smel* 2608

PART III.

SECT. II.
Of things amiss in the Hair and Nails.

Chap. 1. *Of the Nature of the Hairs* 2611
Chap. 2 *Of things amiss in the Hair; and first, of Baldness and want of a Beard.* 2613
Chap. 3 *Of the shedding of the Hair* 2616
Chap. 4 *Of* Alopecia *and* Ophiasis 2618
Chap. 5 *Of* Tinea *or Worms eating off the roots of the Hair* 2621
Chap. 6 *Of the Cleaving of the Hair* 2622
Chap. 7 *Of hoariness in the Head and Beard* ibid
Chap. 8 *Of the Scurfiness and Dandrif of the Head* 2626
Chap. 9. *Of* Plica Polonica 2627
Chap. 10 *Of the Vices of the Nails* 2643

PART IV.
Of Wounds.

Chap. 1 *Of the Nature, Causes, and Differences of a Wound* 2593
Chap. 2 *Of the Diagnostick Signs* 2595
Chap. 3 *Of the Prognosticks, and the foretelling of the Event of Wounds* ibid.
Chap. 4 *Of the Cure of Wounds, and first of all, touching the Indications* 2614
Chap. 5 *Of things extraneous, and from without, that are to be taken forth of a Wound.* 2616
Chap. 6 *Of the Provision that is necessarily to be made for the binding up of Wounds.* 2619
Chap. 8 *Of the Swathing of wounded parts.* 2622
Chap. 8 *Of those Medicaments that are necessary for the Curing of Wounds* 2628
Chap. 9 *My Judgment touching the Method of* Cæsar Magatus, *and* Ludovicus Septalius, *in their*

their Curing of Wounds 2639
Chap. 10 Of the Weapon Salve 2654
Chap. 11 Of altering Medicaments, and Vulnerary Potions 2663
Chap. 12 Of the Diet of Wounded Persons. 2667
Chap. 13 Of keeping the flux of humors from the Wounded part 2669
Chap. 14 Of the Wounds of the Veins and Arteries; and of the stopping the Hæmorrhage in Wounds 2671
Chap. 15 Of the Wounds of the Nerves, and Tendons, in general, and of the pricking of the Nerves 2674
Chap. 16 Of the downright Wounds of the Nerves, as also of the Ligaments, by Cutting. 2683
Chap. 17 Of the Wounds of the Joynts. 2685
Chap. 18 Of a Wound with a Contusion. 2687
Chap. 19 Of Wounds caused by the biting of Living Creatures 2689
Chap 20 Of Wounds by Gun-shot 2691
Chap. 21 Of Poysoned Wounds 2704
Chap 22 Of Particular Wounds 2710
Chap. 23 Of the Diseases, and Symptoms that happen unto Wounds ibid.
Chap. 24 Whether it be Lawful for a Christian by Amulets (the Greeks cal them Periapta, we Preservatives) or else by hanging Seals about their bodies, or by the like means to defend and preserve themselves from all danger by Weapons. 2716

PART V.

Of *Fractures.*

Chap. 1. Of Fractures, and the Cure of them in General 2727
Chap. 2 Of a Fracture with a Wound 2739
Chap. 3 Of a Fracture with a Wound in which there is no bone made bare, and yet nevertheless a Cause to fear the falling forth of some fragments of the broken bone 2742
Chap. 4 Of the preternatural Affects that happen unto Fractures 2744
Chap. 5 Of Distorted and ill set Bones. 2745
Chap. 6 Of Correcting the Callus that is greater or less then what it ought justly to be. 2746
Chap. 7 Of the Slenderness and Weakness of the Member 2747
Chap. 8 Of the Fracture of the Arm. 2748
Chap. 9 Of the Fracture of the Shoulder. 2749
Chap. 10. Of the Fracture of the Leg 2750
Chap. 11 Of the Fracture of the Thigh. 2751
Chap. 12 Of the Fracture of the Nose 2753
Chap. 13 Of the Fracture of the Jaw bone 2754
Chap. 14 Of the Fracture of the Channel bone, or the Bone of the Throat 2755
Chap. 15 Of the Fracture of the Shoulder-blade 2756
Chap. 16 Of the Fracture of the Sternum, or Breast-bone. 2757
Chap. 17 Of the Fracture of the Ribbs. 2758
Chap. 18 Of the Fracture of the Spina Dorsi, or Back bone 2760
Chap. 19 Of the Fracture of the bones of the Hand 2761
Chap. 20 Of the Fracture of the Hip-bone. ibid.
Chap. 21 Of the Fracture of the Whirlbone in the Knee ibid.
Chap. 22. Of the Fracture of the Bones of the Foot 2762

PART VI.

Of *Luxations.*

Chap. 1 Of Luxations in general 2669
Chap. 2 Of a Luxation with Pain, Inflammation, Wound, Fractures 2672
Chap. 3 Of a Luxation of the Mandible. 2674
Chap. 4 Of a Luxation of the Channel Bone. 2675
Chap. 5 Of a Luxation of the Back bone and Ribs 2676
Chap. 6 Of a Luxation of the Shoulder. 2677
Chap. 7 Of a Luxation of the Elbow and Radius 2681
Chap. 8 Of a Luxation of the Hand and its Fingers 2682
Chap. 9 Of a Luxation of the Thigh. ibid.
Chap. 10 Of a Luxation of the Patel Bone. 2685
Chap. 11. Of the Knee Luxated ibid.
Chap. 12 Of the Distraction of the Bracer. 2686
Chap. 13 Of a Luxation of the Foot and its Bones, and of the Toes ibid

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THE FIFTH BOOK OF Practical Physick.

OF THE EXTERNAL DISEASES.

THE FIRST PART.

Of Tumors.

Chap. 1. *Of the Nature, Causes, and Differences of Tumors.*

The names of a Tumor.

THAT External Affect which by the Latines is termed a *Tumor*, *Tuber & Tuberculum*, *i. e.* a greater or a lesse Swelling; the same do the Grecians call *Onchus*; it is likewise by *Hippocrates* and the ancient Greek Physitians named *Oedema*. For although in the account of latter Physitians, yea, and in *Galen*'s time also, such tumors as were soft, and though roughly handled were yet altogether void of pain, these only were said to be *Oedemata*, which the Ancients with an addition called *Oedemata Malthaca*, and *Anodyna*, that is, soft and painless Swellings: Yet this word *Oedema* with *Hippocrates* and the more ancient Physitians signifieth in general all, and every particular preternatural Tumor; as is observed by *Galen* in the 1. Prognost. text 29. in his Comment upon B. 4. of the Aphorisms, Aph. 34. on the fift of the Aphorisms, Aphor. 65, 66. and elsewhere very frequently. Somtimes also by a general name they cal it *Phyma*, and then generally it signifies every Tumor that of its own accord, and without any external cause breaks forth, especially into some one or other outward part of the body; even as a Plant shoots out of the Earth: the truth of this will soon appear, if we consult *Galen* in the sixth of his Epidemicks, Comment. 1. text. 23. In the Books of the more modern Latines, theirs especially whom they usually stile barbarous, or illiterate, al sorts of whatsoever Tumors are comprized under the name of an Apostem; nay more, among these latter Physitians there want not some, who haply ignorant enough of the Greek Tongue, make bold to write that all those are very much mistaken who assign any difference between the name of a *Tumor* and an *Apostem*: which Magisterial Censure of theirs notwithstanding clashes both with the Authority of all the more ancient Physitians, and the propriety of the Greek Tongue. for the Greek Physitians wil have only that Tumor or Swelling which is come to a suppuration, to be called an *Apostem*, as after in the third Chapter shal be shewn; and by the Latines this Tumor is termed *Abscessus* and *Vomica*; but by the more Modern and ignorant Authors it is rendered *Exitura*, from a word taken out of the Interpreter of *Avicen.* But now, all Swellings (or Tumors) come not to a suppuration; as for instance, that which we commonly call *Erysipelas* or St. Anthonies fire, *Herpes*, and oftentimes *Phlegmone*, which is an unnatural Swelling hot and red, and of such like Tumors divers others.

Oedema

Phyma.

Tumors whether rightly called Apostems

Apostem, what it is

Neither is this confusion and promiscuous use of names to be charged upon the Arabians, but

upon the illiterate Interpreters of them, who have unskilfully rendered the Arabian words by such as are very unfit and improper. For the Arabians altogether as exactly as the Grecians have made a distinction in name betwixt Tumors and Apostems; calling Tumors by a general name *Bothor*, but an Apostem they termed *Dubellet* and *Dubellatum*. And therefore for the due and proper signification of each word, the Authors that have written in the same, and not in a differing Language, are to be consulted; that is to say, as *Galen* in his smal Tract to *Thrasybulus* (whether or no the art of preserving the health relate to Physick) in the thirty second Chapter tels us; if it be a word of the Assyrian Tongue, we must for the right understanding of it have recourse to those who were the Authors thereof; or if it be a word in the Persian, Indian, Arabian, or Æthiopian Language, or any other Tongue, we must accordingly apply our selves to such as are skilful therein.

A Tumor

Now then, what a Tumor may properly be said to be, we wil here make an exact inquiry, with this proviso, of which the Reader is desired to take notice, that our chief and main drift is here to treat of such Tumors as are besides Natures intention, and may therefore be justly ranked among the several kinds of Maladies, or Diseases. Now therefore every swelling or augmentation of a part beyond its natural habit may not be reputed a preternatural Tumor. For although some men that are fat and grois grow to breadth and thickness beyond their Natural habit; yet notwithstanding, whenas hereby there is not the least hurt or detriment of any one action caused in them (in which case only something is said to be preternaturally affected) these may not be said to have in them any thing that is beside the intent of Nature, or preternatural, but only something that is not Natural, and above that which is according to Nature, as *Galen* saith. For there is this middle constitution betwixt those bodies that are in al points according to Nature, and those that have in them somwhat that is preternatural, or besides Natures intention, as the same *Galen* gives us to understand in his Book of this sort of Tumors, in the first Chapter thereof. So then, albeit haply the growth of some one part may be extended beyond its natural habit, yet so that this notwithstanding its operations may not be impeded, and that there be not the least sense of pain accompanying it; in this case we say, that such like Tumor or Swelling is not besides Nature, neither as yet is it to be termed a Disease, but rather a symptom. And hence it is also that *Galen* in his Book of Tumors, entitles it, not of Tumors simply so called, but of Tumors preternatural. And much less reason is there that the Breasts of Nurses when they are distended with the abundance of milk, and hereupon are wont to appear far greater than in those that give not suck; and likewise in child-bearing Women that the lower belly though exceedingly dilated in such especially who are neer their time of Delivery, should be said to be affected with a Disease; in regard that these things happen according to the course and Laws of Nature.

Every Tumor is not a Disease

But what a Tumor is, and unto what kind of Disease it belongs, is not altogether so manifest. For many and differing definitions hereof we find given by several Authors, which here particularly to recite is not requisite, nor worth the while; and *Galen* himself seems now and then to thwart himself, and not alwaies to be of one and the same judgment in giving us the definitions of this Tumor we are now treating of. For in his thirteenth Book, and first Chapter, of the Method of Physick, he tels us that a Tumor is a Disease wherein the parts have receded from their natural habit and quantity. And in his first Book of the causes of Symptoms, and the second Chapter, he refers Tumors unto organical Diseases; for there he writes, that *Phlegmones* or Inflammations, *Scirrhos* or hard Swellings in the Skin, *Abscessus*, i. e. Impostumes or Ulcers, and other affects of this nature are to be accounted Diseases of the parts instrumental. But in his Book of the difference of Diseases, Chap. 13. and of the Causes of Diseases, Chap. 6. he reckons up Tumors among the distempers arising from the first qualities, and the diseases of the similary parts. The Physitians likewise that have written since his time differ in their Opinions. *Fallopius* adheres to *Galen*'s Opinion in his 13. Book, Chap. 1. of the Method of Physick, before mentioned, and refers Tumors unto those Diseases we cal instrumental, to wit, when there is a preternatural magnitude or augmentation. *Hieronymus Capivaccius* (in the Chapter where he writes concerning a Phrensie) tels us, that every tumor must needs be a disease in the *intemperies*, or distemper proceeding from the first qualities; and that there is no necessity why it should be accounted an Affect arising from an ill constitution: which Opinion of *Capivaccius* is assented unto by *Hieronymus Fabricius ab aquapendente*. But others there are, among whom *Eustachius Rudius* is one, who assert that a Tumor is an evil compounded of magnitude augmented, and a distemper alwaies accompanying it as its concomitant; and that the augmentation of magnitude with this *intemperies*, or distemper proceeding (as before said) from the first qualities, is the formal cause of every tumor; and *Rudius* determines that those tumors only which are caused in the parts by reason of a preternatural afflux of matter, are Tumors properly so called; but that the Tumors happening in disjoyntings or dislocations, in the falling down of the Intestines into the Cods, and in the Tumor *Aneurisma*, are not properly so to be accounted.

A Tumor what it is

But if we exactly weigh this Controversie, and withal accurately sift out the signification of the word *Tumor*, and *Onchus*; and likewise if we wil heedfully inquire into the essence of a Swelling, as it may be considered in it self, we must then with *Galen* rightly define a Tumor under the notion of a swelling; that it is an affect or disease in the which the parts of our body recede from their natural state by an augmentation of their magnitude. For the word *Onchus* with the Grecians sounds as much as the distance of the parts, to wit, by reason of their being extended in magnitude, breadth, and profundity; as is observed by *Galen* in the first Chapter of his Book of Humors: so that it may justly be reputed a grand absurdity in the definition of a Tumor, to assert that it is this or that, and in the mean time to omit the augmentation of magnitude; this being all one as to affirm that a Tumor may be without a Tumor, that is to say, a Swelling. For although it be a truth (which erewhile we hinted, and that which *Galen* likewise observes in his Book of the differences of Diseases, the twelfth Chapter) that a Tumor if it be not such, and so great that thereby any hurt and detriment shal accrue to the Member affected in any one of its operations, is not properly a disease, but a symptom; and that that preternatural Affect ought to be defined rather by the *intemperies* or distemper that accompanies it, and very much annoyes the actions, then by the swelling, which in no wise impedes or offends them: Yet notwithstanding it wil not therefore follow, that a Tumor also which is a disease, and which doth indeed so greatly hurt and hinder the operations, is to be defined rather by the *dyscrasie* and *intemperies*, than by the augmentation of magnitude. And the truth is, that very frequently Tumors when they have their original either from a fleshy, or from a boney and hard substance, or lastly from a flatulent Spirit, which is not internally either hot or cold, are altogether free from an *intemperies*, or, as we commonly term it, distemper. In the mean time notwithstanding we deny not but that other diseases that are no way essential to a Tumor may yet be joyned with and accompany this augmented magnitude which doth altogether constitute and make up the essence thereof. For if the matter causing the Tumors exceed in heat, cold, driness, or moisture, it forthwith derives this distemper unto the part affected; insomuch that hence it comes to pass that the disease also then concurs, and is concomitant with the *intemperies* or distemper. Moreover, if the same matter shal either by corroding or distending any part disunite what before was close and compact, then there immediately happens that which we call the solution of Unity. Sometimes also it comes to pass that the figure and shape of some part is altogether marr'd, or at least very much vitiated; and sometimes likewise the Cavities, Pipes, and Passages are either compress'd, or at least wise very much obstructed through the abundant afflux of matter: the which accidents very frequently (if not for the most part) concurring with a Tumor, hence it is also that in the difference and cure of Tumors, we handle not only the augmented quantity, but likewise even al those other concomitant Diseases. Mean while it stands good for an undeniable truth, That a Tumor as such, that is, a Swelling, is an affect or disease in the magnitude augmented beyond Natures intention, and hath its production from somwhat that is preternatural, and comes to be adjoyned to some one or other part. Nor is it of any validity what *Rudius* here objects, That in Tumors which have their original from the humors, and those likewise which have for their causes the strutting forth and falling down of parts, and such like, that there the difference is to be taken from the efficient, next, and containing cause, and that from this cause we may gain excellent, artificial, and profitable Indications; but not so from the consideration of magnitude augmented. For albeit they differ in the containing special cause, that this is now and then an humor, sometimes above, and sometimes also an Intestine or Gut fallen down; yet in the general cause they agree, which is some one thing or other preternatural added unto the part, and swelling it up into a Tumor. And in every Tumor (as it is likewise in al other diseases depending upon the cause containing) no profitable Indication can be gained, or may be expected from this cause, no not in those Tumors which have their dependance upon the influx of humors. For the general Indication (though it be altogether useless) is this, that the humor which lifteth up the part into a tumor is to be removed; but how and by what means this may be effected, is wholly left unto the skil of the knowing Artist. In the mean time I wil not deny but that those tumors which have their original from the humors may fitly enough be ranked among the diseases that are compounded of augmented magnitude, distemper arising from the afflux of matter, and a vitiated figure; yet however this is not to be granted in al Tumors. And hence it is (without doubt) that *Galen* hath placed the Tumors one while amidst the Affects of the similary parts, as in the twelfth Chapter of the difference of Diseases; and assoon again among those Diseases we call organical, and this he doth in the thirteenth of his Method, and first Chapter.

The definition of a Tumor

Neither is it to be denied, That now and then Authors whilst they make mention of preternatural Tumors do not intend al Tumors in general, such as are also those that are produced by the falling down of the bowels, or by some boney substance sticking out; but those in special which are caused by the afflux of humors; and these are evermore diseases that may properly be said to be compounded of magnitude augmented, *intempe-*

ries, an unmeet figure, and most usually also the solution of Unity.

The Cause The containing Cause of a Tumor, as we take it in the general, is something beyond Natures intent added unto a part, which elevates, distends, and swels it up to a more than ordinary greatness.

The Difference Now the matter which we say is added being threefold, to wit, a Humor, a Wind, and a solid Substance; the primary Difference then of Tumors ought to be taken from that which we commonly term the Containing Cause. Tumors then are sometimes thus differenced, that some are great, others not so; some external, some internal; some new, others that are of longer standing. But these differences are meerly accidental, denoting a certain mutation or change, and an alteration of the condition, but the *species* or kinds they vary not in the least. But the differences specifical, and which constitute the several kinds, are taken from the matter and the containing Cause, which is threefold, as hath been said. First of al therefore Tumors derive their very being from the humors; but these as yet have not obtained any peculiar appellations to be called by, but at leastwise are al of them comprehended under the general name of a Swelling; yea, as some say, they are only called *Tumors*. Secondly, Winds if shut up in any part distend the same, and lift it up into a Swelling or Tumor; and this sort of Tumors the Grecians cal *Emphysemata*, the Latines *Inflationes*, by reason of their windy original. In the third place, now and then somwhat resembling flesh, or skin, or that is hard and solid as a bone, and other such like matter is super-added unto some one part, and there causeth a Tumor or Swelling: But in regard that these very substances have their original from the humors, we will thereupon adjoyn this sort of Tumors unto the first kind. And lastly, even the very solid parts of the body themselves cause Tumors whenas they change their place, together with their scituation, and slip down upon some other part, which they both distend and elevate: neither have these any peculiar names to be known by. There are yet some other differences behind. From the quality of the concomitant matter, some are said to be hot, others cold; some moist, others dry; some soft and loose, others hard. From their magnitude, the greater of them are by a general name simply called Tumors, the less *Tubercula*. From their scituation, that some are internal, others external; and these again either more deep and profound, or else superficial. From their figure, some of them are said to be broad, others again sharp-pointed. But now to comprehend al those differences of Tumors under names, and to give you the number of them, is not very easie to do. *Galen* in the close of his Book of Tumors writes, That there was not any one kind of these preternatural Tumors which there he had omitted, but that he had spoken of them all, and had not left any one unmentioned. And out of that Book *Johannes Philippus Ingrassias* (in his Book of tumors, first Tract, first Chapter, and second Commentary, pag. 77.) hath collected Sixty one Tumors, which he reckons up in this order: 1. *Corpulentia*. 2. *Phlegmone*. 3. *Abscessus calidus*. 4. *Sinus*. 5. *Fistula*. 6. *Abscessus ex solidis humidisve corporibus*, that is to say, an impostumated matter issuing from solid and moist bodies. 7. *Atheroma*. 8. *Steatoma*. 9. *Meliceris*. 10. *Anthrax*. 11. *Cancer*. 12. *Gangræna*. 13. *Sphacelus*. 14. *Erysipelas*. 15. *Herpes similiter*. 16. *Herpes Esthiamenos*. 17. *Herpes miliaris*. 18. *Scirrhus*. 19. *Ecchymosis*. 20. *Aneurisma*. 21. *Oedema*. 22. *Phagedæna*. 23. *Ulcus Chironium, seu Telepium*. 24. *Scabies*. 25. *Lepra*. 26. *Elephantiasis*. 27. *Exostosis*. 28. *Satyriasmus seu Priapismus*. 29. *Achor*. 30. *Cerion*. 31. *Myrmecia*. 32. *Acrochordon*. 33. *Psydracion*. 34. *Epinyctis*. 35. *Dothien*. 36. *Phyma*. 37. *Bubon*. 38. *Phygethlon*. 39. *Struma*. 40 *Sarcocele*. 41. *Hydrocele*. 42. *Epiplocele*. 43. *Enterocele*. 44. *Entero epiplocele*. 45. *Cirsocele*. 46. *Varices*. 47. *Bubonocele*. 48. *Exomphalos*. 49. *Ascites*. 50. *Tympanites*. 51. *Anasarca*. 52. *Epulis*. 53. *Parulis*. 54. *Thymus*. 55. *Uva*. 56. *Paristmia*. 57. *Antiades*. 58. *Polypus*. 59. *Encanthis*. 60. *Unguis*. 61. *Staphyloma*. But *Ingrassias* himself not content with this number, adds unto these one hundred sixty five more; to wit, of such properly belonging unto the head, twenty seven, the which in page 301. he enumerates after this manner: 1. *Eczesma*. 2. *Elcydrion, sive Papilla*. 3. *Sycon*, that is, a Fig, or pushes in the head resembling it. 4. *Exanthema*. that is, an Ulcerous blowing out like a flower. 5. *Ganglion*. 6. *Hydrocephalus*. 7. *Syriasis*. 8. *Phrenitis*. 9. *Lethargus*. 10. *Typhomania, seu agrypnon coma*. 11. *Catochus Pauli*. 12. *Catalepsis, seu Catoche*. 13. *Carus*. 14. *Apoplexia*. 15. *Rhia alsabian*. 16. *Sibare*. 17 *Fatera*. 18. *Sekakilos*. 19 *Testudo*. 20. *Talpa*. 21. *Topinaria*. 22. *Lattumen*. 23. *Cornu*. 24. *Alopecia*. 25. *Ophiasis*. 26. *Pityriasis*. 27. *Phthiriasis*. Those properly belonging to the Eyes and the parts thereof, sixty three, which in page 351. he reckons up in this order following. 28. *Proptosis* Galeni, *sive ecpiesmos Pauli*. 29. *Taraxis*. 30. *Ophthalmia*. 31. *Epiphora introductorii*. 32. *Chemosis*. 33. *Xerophthalmia*. 34. *Sclerophthalmia*. 35. *Scirrhophthalmia*. 36. *Phlyctæna*. 37. *Bothrion*. 38. *Cæloma*. 39. *Argemon*. 40. *Epicauma*. 41. *Encauma*. 42. *Myocephalos*. 43. *Melon*. 44. *Clavus Pauli et Aetii*. 45. *Clavus introductorii & Celsi*. 46. *Hypopyon*. 47. *Onyx*. that

Tumors, their number and names according to Galen.

Tumors, their number and names according to Ingrassias.

Tumors of the Head are twenty seven.

Tumors of the Eyes, and their parts, 63.

that is, *Unguis*, a Nail. 48. *Hypospbagma.* 49. *Achlys Aetii.* 50. *Nephelion Aetii.* 51. *Ula*, or *Nephelion.* 52. *Leucoma.* 53. *Sebel.* 54. *Bothor Avicennæ.* 55. *Hymene panastasis.* 56. *Nyctalopia.* 57. *Anthracosis.* 58. *Carcinoma.* 59. *Synchysis.* 60. *Mydriasis.* 61. *Proptosis Pauli.* 62. *Ptylosis.* 63. *Madarosis*, or *Milphosis.* 64. *Pladarotes.* 65. *Emphysema.* 66. *Symphysis*, or *Ancylosis.* 67. *Entropion.* 68. *Lagophthalmos.* 69. *Trachoma.* 70. *Sycosis.* 71. *Tylosis.* 72. *Dasyma.* 73. *Pachytes.* 74. *Barytes.* 75. *Hydatis.* 76. *Psocophthalmia.* 77. *Trithe.* 78. *Thalazion.* 79. *Porosis.* 80. *Lithiasis.* 81. *Alantiac.* 82. *Sude Avicennæ.* 83. *Sarcosis.* 84. *Lupia.* 85. *Mydesis.* 86. *Pustula Abenzoaris.* 87. *Scleriasis.* 88. *Anchilops.* 89. *Ægylops.* 90. *Epinyctis Plinii.*

Tumors in all other parts of the Body, 97.

And after these he mentions many more in other parts, to the number of ninety seven; and in this following order he sets them down. 91. *Auritus.* 92. *Parotis.* 93. *Therea.* 94. *Ozæna.* 95. *Sarcoma.* 96. *Thelui Albuc.* 97. *Alharbian Avicennæ.* 98. *Chaisum Arabum.* 99. *Hæmorrhoides Arabum.* 100. *Batrachos.* 101. *Glossomegethos.* 102. *Ancyloglosson.* 103. *Aphtha.* 104. *Cynanche.* 105. *Paracynanche.* 106. *Synanche.* 107 *Paresynanche.* 108. *Gongrona.* 109 *Folium.* 110 *Bronchocele.* 111 *Albadal.* 112 *Dionysisci.* 113. *Hypopion.* 114. *Jonthi*, or *Vari.* 115 *Montagra.* 116 *Ephelis.* 117 *Ignis sylvaticus.* 118. *Noli me tangere.* 119 *Buttizaga.* 120 *Gutta rosacea.* 121 *Sparganosis.* 122. *Chondriosis.* 123 *Trichiasis.* 124 *Gynæcomaston.* 125 *Pleuritis.* 126 *Peripneumonia.* 127 *Phtoe.* 128 *Althabalop.* 129 *Napta.* 130 *Cyphosis*, or *Cyrtosis & byposis.* 131 *Lordosis.* 132 *Scoliasis.* 133 *Cœliacus.* 134 *Aurys Rasis.* 135 *Colica.* 136 *Heos.* 137 *Condylomata.* 138 *Hæmorrhoides.* 139 *Marisca.* 140 *Hepaticus.* 141 *Cachexia.* 142 *Altherel, Bellunensis.* 143 *Thelegi.* 144 *Altherbel Bellunensis.* 145 *Splenicus, Aureliani.* 146 *Nephritis.* 147 *Lithiasis.* 148 *Satyriasmus Pauli.* 149 *Cercosis.* 150 *Mola.* 151 *Nymphomegethos.* 152 *Kion Hippocratis.* 153 *Seliroma Pauli.* 154 *Arthritis.* 155 *Podagra.* 156 *Cheiragra.* 157 *Ischias.* 158 *Lupia, Guidonis.* 159 *Tophi.* 160 *Cornua Avicen.* 161 *Ancylosis*, or *Ancyla.* 162 *Paronychia.* 163 *Pterigion, Celsi.* 164 *Condyli.* 165 *Pernionès.* 166 *Gemursa, Plinii.* 167 *Dentes muris, Bellunensis.* 168 *Alliathan.* 169 *Lupus.* 170 *Dactilia, Habab.* 171 *Malum mortuum.* 172 *Terminthos.* 173 *Emphysema.* 174 *Phlyctæna.* 175 *Turmusios Avicen.* 176 *Impetigo.* 177 *Essere.* 178 *Palmos.* 179 *Clavus.* 180 *Calli.* 181 *Ægritudo bovina, Abenz & Albuc.* 181 *Draconium.* 183 *Syrenes*, or *Pedicelli, Guidon & Argelatæ.* 184 *Variolæ.* 185 *Morbilli.* 186 *Rubeola.* 187 *Crystalli.* 188 *Exanthemata.* 189 *Ecthymata*, Fernel. 190 *Hidroa*, or *Sudamina.* 191 *Epinyctis*, Romanorum. 192 *Bothonenes.* 193 *Ganglia.* 194 *Seps* Hippocr. 195 *Spina ventosa.* 196 *Bubasticon Ulcus.* 197 *Hypersarcon.* 198 *Cacoethes.* 199 *Sepedon.* 200 *Nomæ.* 201 *Therioma.* 202 *Herpes Esthiomenos Celsi.* 203 *Herpes ecthiomenos*, Avicen. 204 *Thymion*, Celsi. 205 *Ignis sacer*, Celsi. 206 *Cerion*, Pauli. 207 *Paratrimmata.* 208 *Apostrmata.* 209 *Zerma.* 210 *Rancula.* 211. *Spina.* 212 *Morsus Diaboli.* 213 *Paturia*, that is, *Morbus Gallicus.* 214 *Scopuli.* 215 *Tincosati.* 216 *Pinitæ.* 217 *Spili.* 218 *Tusius*, Avicen. 219 *Eparma*, Hippoc. 220 *Rosbotb.* 221 *Cunus, Rasis.* 222 *Albothir*, Albucasis. 223 *Nakir*, Albuc. 224 *Aichalan*, Abenz. 225. *Arcella*, Abenz. 226 *Rosulæ sataritiæ.* So that the number of all the Tumors recited by *Johannes Philippus Ingrassias* amounts unto two hundred twenty six.

But that Entities should be multiplied in this manner without any cause is altogether unfitting. For, as al the affects which are here reckoned up under the name of Tumors are not properly to be accounted Tumors; besides that one and the same Tumor is sometimes repeated under different names: So again, *Ingrassias* having not at this time compleated the remaining Sections of his Works concerning Tumors, it is not sufficiently apparent what Tumors he would have us to understand under some of these names. Now for the truth of this, that I may give you an instance or two of what hath been said; he reckons up among Tumors, *Sinus* and *Fistula*, *Ulcus Chironium*, and divers other Ulcers. But before or since *Ingrassias*, who hath there ever been that hath taken the liberty, or made so bold to enumerate among the Tumors that are properly so called, such as are these following; viz. *Lethargus, Typhomania, Catochus, Catalepsis, Carus, Apoplexia, Lordosis, Cœliaca affectio, Colica, Affectus hepaticus, Splenicus*, and other such like Affects, which relate either to Symptoms, or the kinds of other Diseases, rather than unto Tumors. And in very truth many of the Tumors wherewith this Catalogue is stuft, are not peculiar kinds of Tumors, but only differences of their species according to the parts affected.

Tumors, their Differences.

Now therefore we conceive that there are two main Differences especially to be heeded in Tumors; one whereof ariseth from the variety of Causes, and the other is by reason of the parts affected. We have said before, that the conteining cause of a tumor is threefold, a Humor, a Wind, and a solid Substance. Again, the humors are various & much different, to wit, Blood, Phlegm, Melancholy, a black humor, a waterish and wheyish humor, and divers other thin excrements; as also mixt humors, and matter into which other humors degenerate, and likewise malignant humors.

Their Cause containing:

From the Blood there is caused an extraordinary Corpulency (which the Greeks call *Polysarcia*) and an Inflammation. There are likewise that re-

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fer a Gangrene & a *Sphacelus* unto an Inflammation, in regard that an Inflammation sometimes degenerates into them. But because that a Gangrene and *Sphacelus* do very often proceed from other causes without an Inflammation, and have not alwaies a Tumor to accompany them, and are of neerer alliance unto Ulcers, very usually degenerating into them; we wil therefore treat further of them anon when we come to speak of Ulcers. But with more right it is that unto an Inflammation we refer an *Erysipelas*, or *Rosa* (as it is commonly termed) *Bubo*, *Furunculus*, *Phyma*, *Phygethlon*, *Parotis*, *Carbunculus*, *Paronychia*, *Perniones*, *Ecchymosis*; as afterward from the special Explication of these Affects wil further appear.

From Choler is produced *Herpes*, and its differences.

From the Pituitous or Phlegmy humor proceeds *Oedema*.

From the Melancholly humor, *Scirrhus*.

From black Choler, *Cancer*.

From the watry humor, *Hydrocephalus*, *Hernia aquosa*.

But of the wheyie humor, and the thin excrementitious matter called *Ichores*, from which various lesse swellings by the Latines called *Tubercula* do arise, there is a very vast difference: and oftentimes these serous and wheyie humors, as likewise the salt and cholerick humors are mingled with other, and from hence originally proceed divers Wheals or Pushes in the skin, as to instance, *Psydracia*, *Vari*, *Sudamina*, *Spinyctides*, and *Terminthi*, *Essere Arabum*, *Eloydria*, *Scabies*, *Lepra Græcorum*, *Vitiligo*, *Impetigo*, and *Lichen*, *Crusta Lactea*, *Achores*, *Favi*, *Tinea*, with many other of the like Nature.

Moreover from the humors there is derived also a certain peculiar kind of tumors, yet nevertheless differing from those we have hitherto made mention, of in a twofold respect. The former difference lies in this, that it proceeds not from one single humor, but from more, to wit, Phlegm, I mean such as hath other humors, Melancholly or Choler mixt therewith; yet notwithstanding so, that the cause conjunct may not any longer be said to be an humor, but some other matter generated from out of those humors. The later difference consists in this, that the aforesaid matter is included in some one peculiar Membrane. Tumors of this sort are, *Strumæ*, and *Scrofulæ*, *Bronchocele*, *Ganglia*, *Nodi*, *Melicerides*, *Atheromata*, *Steatomata*, *Testudo*, *Talpa*, and *Natta*.

Out of the humors likewise (where you are to understand such humors that degenerate into another matter) take their rise and original those tumors which the intelligent Artist cals, *Polypus*, *Ranula sub lingua*, *hernia carnosa*, *Verrucæ*, *Fungi*, and others the like. There are moreover tumors that have their very being from malignant humors; and these are *Variolæ*, *Morbili*, *Lepra*, as the Arabians, or *Elephantiasis*, as the Greeks name it, Tumors Venereal of different kinds, *Bubones*, and pestilential Carbuncles.

From flatulency or windinesse are derived *Emphysemata* as the Grecian Authors, or *Inflationes*, as the Latines call them, and all other flatulent tumors whatsoever.

From the solid parts lying out of their proper places arise *Hernia* in the Cods and Navel, when the Intestines fal down thither; *Epiplocele*. And hitherto also is to be reduced *Aneurisma*, a tumor that hath its original from an Arterie dilated, as in like manner *Varix*, being a tumor from a dilated Vein.

From the Bones proceeds that which we term *Exostosis*; and from the Vertebræ or turning Joynts of the Back, when they stick out, is caused *Gibbositas*; like as in other parts also tumors arise, when disjoynted or broken Bones slipping out of their own place happen to fal down thither.

But now those tumors receive various appellations by reason of the part affected, of which enough hath been written already in its due place.

And moreover, as concerning divers of these Tumors this is to be taken notice of; that very many and that in most Countries, have indeed been not a little infested by them; and that they have been likewise as ordinarily cured of them: but yet notwithstanding, what the German, Italian, French, Spanish and other names of several Nations are; and unto what names of the Grecians, Latines, and Arabians they may fitly answer, is not alwaies manifest: which very thing hath exceedingly perplexed and puzled the studious Physician in his perusal of Authors. And of this also *Johannes Philippus Ingrassias* who took a world of pains in comparing together and explaining the Greek, Latine, and Arabian names, extreamly complains, as wil appear by what he writes in his Book of tumors, Tract. 1. Chap. 1. page 220 after this manner. I cannot but exceedingly admire, and withall greatly lament the so great unhappinesse of our Age, in the which we are evermore infested with divers and almost innumerable kinds of Diseases, and day after day are sadly afflicted especially more with this kind of Tumor (he here speaks of *Dothien* or *Furunculus*) by reason of an unwholsome and corrupt kind of Dyet; insomuch that questionless the Affect is most perfectly known; but as for name it hath none, other than what is as obscure (and as ambiguous unto most men) as that of *Epinyctis*, and *Psydracion*; so that hence we find it a business of the highest difficulty to discover the proper head of the Disease, and the Method of curing it, either in the Latines, or the Greeks, and Arabians themselves writing in the Latine Tongue.

Of the signs Diagnostick, Prognostick, and of the indications and Cure of Tumors in generall, some

some there be that are wont to assert many things. But in truth there is but very little that can be said as concerning Tumors in this manner, that is, generally considered, but what for the most part is agreeable to certain species of them; of all which we wil now speak in order, and particularly, in the Chapters following.

Chap. 2. *Of Tumors arising from Humors in general.*

THat kind of Tumors which is caused by the Humors is found to be most frequent and usual; and therefore we wil treat of it in the first place. The primary and nigheft cause hereof is a humor elevating and raising up a part beyond Natures intention unto a greatness more than is ordinary. Which said humor having for the most part a certain excess of qualities adjoyned with it (and thereupon becomes either hot, or cold, or moist, or dry) derives that quality unto the part affected; the which quality since it differeth from the temper of the grieved Member, must therefore necessarily excite in the same an unequal temper; and hence it is that an intemperies or distemper is concomitant with a Tumor.

The Causes.

Now of the humors that cause these Tumors there is great diversity. For both the Natural and preterna tural humors, whose differences we have already spoken to in their proper place, excite Tumors; & hereunto belongs the matter that is wheyey and watereih, filth and corrupt matter, and all things else into which the humors degenerate, and which are to be found in Tumors, and yet are not in the number of the parts of the Body; of which there is great variety. *Galen* in his second Book to *Glauco*, and seventh Chapter, writes, that in Apostems there have been found to be substances contained like unto Stones, Sand, Shels, Wood, Mud or Slime, the filth of Baths, the dregs and lees of Oyl, together with many other such like resemblances. And in his fourteenth Book of the Method of Physick, and twelfth Chapter, he further informs us that in Tumors have been discovered substances resembling Nails, Hairs, Bones, Shels, and Stones. And that Worms also may be found in Tumors frequent experience testifieth; *Fallopius* with others have seen such Tumors; and I my self have more than once beheld the like. *Nicolaus Remigius* in his third Book of the worship of Devils, and first Chapter writes, that with his own Eyes he beheld while they took out of an Impostume ful of filth, and opened in the Calf of a Mands Leg, a certain round substance or Globe, such as is to be seen in Weavers Shops. And *Wierus* in his Book of the Devils impostures Chap. 13. relates that in the incision of an Impostume on the left side of a certain Girl, above the Spleen, there was taken forth an Iron Knife, and after it there issued out abundance of filth and corruption. The like whereunto *Langius* also hath observed, in his first Book, and thirty eighth Epistle. Now if any such strange thing chance to happen, the Vulgar People are wont to ascribe it presently unto the Sorceries, Spels, and Charms of their Devilish Neighbors. But there is no necessity, why for all things that are evacuated out of Impostumes besides purulent matter, we should by and by have recourse to such Causes as these, or rank them among the supernatural Causes of humors, seeing that many of these contingents may be generated out of the humors erewhile rehearsed. For whenas Experience makes it manifest, that in most parts of mans Body smal Stones, Sand and Gravel, Hairs, or such like, and also divers kinds of Worms may be produced out of the excrementitious humors; and that likewise (not only in the Body of man) strange and wonderful kinds of Worms and other little Animals, may be bred out of the Corruption of others, it should not seem any great wonder, that the matter in Tumors (especially if it be naught, and hath been long there shut up and detained) doth admit of those various and strange mutations, happening by means of its rottenness and putrefaction. But yet notwithstanding, if such things be found in Impostumes that are come to a suppuration, and likewise in Tumors, which cannot be generated in mans Body by nature, or at leastwise by Natures strength alone without the concurrence of Art, (such as are all things formed of Metals, Bodkins, Knives, Iron Nayls, and the like) then indeed they cannot be referred unto natural causes; but may upon more than probable Grounds be imputed unto the Impostures, subtilty, and power of the Devil. But as for the manner how such things may be either generated in the Body, or covertly conveyed into it, is not my purpose here to determine. I therefore proceed to dispatch what I have further to deliver touching the rest of the causes of Tumors that take their rise and original from the humors.

The variety of such things as are often found in Apostems.

So then, as for what concerns the causes remote; be they what they will for their kind, they may easily be known, if we do but enquire into the manner how Tumors come to have their first being; and withal take notice from whence, and after what sort, or by what means that humor which hath rightly gained to be stiled the containing Cause, comes into the part affected. Now therefore that humor which is the nigheft and containing Cause of a Tumor is either insensibly and by degrees heaped up in the part, or else altogether as in a heap (which the Grecians express by the word *Athroos*) flow into it. The matter is gradually, and by little and little

Tumors, how caused by congestion or the heaping together of humors.

little gathered together in the part affected, primarily and most especially, by reason of somwhat amiss in the member, to wit, when either the concoctive power is grown weak, and therefore cannot as it should digest the nutriment, but generates more excrements than it ought to do; or else when the expulsive faculty doth not cast out all the excrements as it ought to do; and this may come to pass either through its own weakness, or otherwise because the way by which those excrements should be ejected is not sufficiently open. And again, a humor is likewise then heaped together in the parts, whenas the food it self is naught and unwholsom; for hence it happens that either so great abundance of excrements are caused that the expulsive faculty cannot cast them al forth, or else that they are so thick that Nature cannot easily expel them. But upon what causes these causes do depend hath been already declared in its proper place; nor is it requisite that we should at large repeat what hath been spoken. Only in a few words take this; That the weakness of the faculties wholly depends upon the *intemperies* or distemper of the parts, and the decay of their native heat. The passages are obstructed by overmuch and thick matter, which happens to be condensed by the vehemency of cold. Meats of an ill juyce produce store of excrements: Now what these meats are, *Galen* gives us to understand, in his Book touching meats of a good and evil juyce.

tumors, how caused by an afflux.

How by attraction.

A Humor then flows to some part (this being in truth the more usual cause of Tumors) when either it is drawn by that same part, or transmitted unto it from some other place. Attraction primarily proceeds from heat caused either by overmuch motion, or from the heat of the Sun and Sun-beams, from the fire; or lastly from any sharp Medicine taken in. For the parts so soon as they are heated by these causes draw unto themselves humors from the rest of the body, although there be not therein any excessive store of humors; and yet I deny not but that the more the body abounds with humors, the greater is the store of them that is attracted.

Moreover, Pain likewise frequently enough excites Tumors, by attracting the humors unto the part aggrieved. Yet we say not that pain of it self draws the humors, but that this is done by some other means; and commonly it is said to draw, for these three causes. First, because Nature while she attempts to relieve the suffering part sends in an extraordinary supply of blood and spirits to the part in pain, and this she doth with an endeavor more than usual; so that by this means she over fills, and hurts the parts she intended to succour. Secondly, the grieved part by this time grows hot from that abundance of blood and spirits transmitted thither by Nature; and hereupon fals to drawing more than before, by reason of this adventitious heat. And lastly, pain weakens the Members. Now the Members once weakned, if they attract not, yet they readily receive, and in the least resist not the matter flowing in upon them from several parts.

Secondly, A Tumor is caused by a defluxion, when as the humors are transmitted unto some part, although they be not drawn by that part. For whereas there is in every part a faculty not only of attracting al things familiar and agreeable unto it, but also of expelling and casting out whatever is superfluous and burdensom; hence it is that being stir'd up and provoked by the excess or offensive quality of the excrements and humors it expels and thrusts forth unto some other part whatever is useless, or at least burdensom unto it. Where if it be not digested or evacuated by transpiration, it is thence again forced unto some other parts until at length it come unto the weakest, which is not able to expel these transmitted humors; so that being here left they cause a Tumor. For it cannot be that a Tumor should be caused by the matter transmitted and sent from divers places, unless we grant (as needs we must) that there is a part which sends them, a part receiving them, and the passages by which the humors flow. The parts do then transmit when the vigorous faculty by the quality or store of matter is incited to expulsion. For unless the faculty were provoked, it would never attemp this expulsion; and unless it were strong and vigorous, it could never effect it. And this is likewise much furthered by the external causes exciting the fluxion, to wit, Heat, which attenuates and dissolves the humors; and cold, that by constriction presseth the parts together, and thereby causeth the greater afflux of the said humors.

Notwithstanding, unto these two may be added also a third cause of the defluxion, and that is a certain (ῥόῳ, or) violent issuing forth of the humor it self, as usually it doth appear in persons that have the Dropsie, where we find a water through its own weightiness descending into the Feet and Cods; which motion notwithstanding is wont to cease in the night time; but this would not be if the humor were expelled by Nature; and not rather (as in truth it is) forced down by its own gravity.

the parts receiving

Now as for the humors flowing together from elsewhere, they are received by such parts as are feeble, and through their weakness altogether disposed for the reception of a fluxion. For evermore the more vigorous Members send away that which is superfluous unto the weaker. The weaker Members we account such as either have contracted a certain debility in their very first formation, or being afterward hurt do contract unto themselves a kind of preternatural constitution; or else they are such

as

as Nature her self makes and intends for weak, and so framed and constituted that they may the more easily receive the excrements of other parts: such are the skin, and the parts loose and porous. For Nature (that she might the better preserve the principal and more noble parts from Diseases) hath purposely ordained in mans body some certain parts weak and feeble, that so the principal parts oppressed and burdened with Humors might into them empty whatever is superfluous and burdensom; and these (as we have said) are the skin and glandulous or kernelly parts. And hence it is that the Heart transmits the peccant humors unto the Arm-pits, the Brain sends them behind the Ears, and the Liver thrusts them forth to the Groyns. The parts ready to receive are al those that have any connexion with the part that transmits the humors, and which have the passages through which the humors are conveyed alwaies patent and open; but as for waies whereby to expel and drive them forth, they are either none at al, or otherwise such as are exceeding narrow and over streight; or else lastly, these passages are so scituated that they lie directly under the parts transmitting, so that the conveyance of Humors unto them from the abovesaid parts is render'd the more facile and easie.

the passages by which the tumors flow.

As for the waies and passages through which the humors run, they are either such as lie hid, or else such as are open and very manifest. For whereas the whol body is confluxile, that is to say, apt and ready to flow together; hence it is that the humors have their fluxion out of one part into another by these occult or hidden passages. So the Whey (as we may term it) being gotten in great abundance into the *Abdomen*, or Cavity of the Belly (commonly called the Paunch) by these privy Passages descends into the Cods and the Thighs, and lifts up the said parts even unto a Tumor or swelling; the same which likewise very often happens in other parts. Somtimes the humors assembled together betwixt the Skul and skin of the Head descend thence along under the skin into the inferior parts; but very seldom and rare it is that from hence any tumors are produced. But most an end those humors which excite and raise tumors flow through passages that are patent enough, the Veins and Arteries.

the differences of tumors whence they are taken.

But that we may briefly come to speak of the differences of Tumors arising from Humors, although very many of these differences are accidental, yet notwithstanding those by which the tumors proceeding from humors are truly and properly distinguished among themselves, are taken from the variety of the containing Cause, or the Humor as an efficient cause producing the Tumor. Now the Humors are divers, Blood, Choler, Flegm, Melancholy, black Choler, Choler adust, and Whey. From which likewise various sorts of Tumors are excited and caused. And then again, one while the humor exciting the tumor is (as we use to say) simple and sincere, from whence also the tumor proceeding therefrom is said to be a pure tumor; or anoon again divers humors concur to the making up of one Tumor; and from hence the Tumors which we term spurious, (that is, such as are improperly so called) take their Original.

The Signs Diagnostick.

It is easily known whether the Tumor proceed from the falling down of any part: and if this be not the Cause, we may then lately conclude that the rise of it is from the afflux of humors unto the part affected.

But now whether or no the Tumor takes its beginning from congestion, or rather from fluxion, may by this be discerned; to wit, that those Tumors which are caused by congestion or the storeing up of humors, are a longer while and by degrees arriving at their perfection; neither take they up so much room in the part; nor (lastly) was there any the least preceding cause or sign of a defluxion. But now if the tumor be generated from a fluxion, it wil be discerned by the presence of the contrary signs. And certainly if so be there were not in the grieved part any foregoing pain or heat, it manifestly shews that the said fluxion is caused by a transmission, and not by means of an attraction: like as on the other hand, a preceding pain or heat of the affected part argues the Tumor to proceed from the attraction of humors.

For the Signs whereby to discern and understand the times, take this advertisement; viz. That the beginning of it is then when the part first of al is perceived to be distended and stretch'd forth. The increment or growth, when as the part appears now to be elevated into an indifferent big swelling, and when the Symptoms that accompany al sorts of Tumors are evidently augmented. The state or heighth of it is, when the swelling and (with it together) al the symptoms are at their highest pitch. The declination is then, when both the bulk of the swelling, and all the symptoms are sensibly diminished.

The Signs Prognostick.

1. As for the Prognosticks of Tumors in general, take this for an observation; That in reference to the place aggrieved, inward Tumors are alwaies accounted to be more dangerous than those which are external; and as considered of themselves, they have in them more or less danger of death according to the excellency and use of the part affected.

2. By how much the greater the Tumor, as likewise by how much the greater the *intemperies*

or the distemper accompanying it, is; and by how much also the humor exciting the Tumor is more malignant and vitious; with so much the greater danger and difficulty is the Cure thereof to be expected. And on the other side, look by how much the humor generating the Tumor is more mild and benign, so much the less of danger is there in it, and likewise so much the less of difficulty in the curing thereof. But of all the sorts of Tumors, those arising from a windiness are with the greatest facility remedied, as being in a manner discussed and dissipated of its own accord.

Tumors arising from the humors how many waies terminated:

3. All Tumors deriving their Pedigree from the humors, unless they make a retreat, and then vanish, either of their own accord, or forced thereunto by Medicaments taken in for Natures assistance, are usually terminated these four waies (as *Galen* in his B. of an unequal temper informs us) to wit, either by dispersion, which you may likewise cal discussion, wrought by insensible transpiration; or else secondly, By suppuration, when as the humor which causeth the swelling is converted into a purulent matter; or else thirdly, By corruption, when as the constitution and the radical heat of the part affected is destroyed and wholly corrupted by the pravity and malignancy of the matter; or else lastly, By induration, when the matter that gives being to the Tumor hath acquired an accidental and adventitious hardness.

The signs of a tumors resolution.

Of Resolution an infallible sign is, a lightness in the Member (contrary to its former weight and heavyness) and a cessation of the troublesome beating with which it was formerly disquieted.

The signs of the suppuration of a tumor.

The Signs of a neer approaching suppuration are these, *viz.* a pain and palpitation in the part, together with a Feaver, either now invading it, or at least the increase of a Feaver already and formerly present; according to that of *Hippocrates* in his second Book, and forty seventh Aphorism, While the peccant and crude matter is under concoction, and until it arrive at a ripeness, and maturation (as we usually term it) Feavers are alwaies present. But so soon as the concoction of the crude or raw matter is compleated, so that the filth and impostumated matter appear, then the part becomes in a manner lighter than it was, the heat abated, diminished, the pain assuaged, and a part of the Tumor is eminently elevated, and begins to grow sharp or sword-pointed; and this sharp point forthwith becomes of a white colour; and the part if touched with the Finger seems softer; and the purulent matter sensibly appears to fluctuate and yeild unto the touch of the Hand. Yet notwithstanding it oftentimes chanceth, that the filth and corruption lies altogether hid and obscured, so that it may not easily be discerned, either by reason of the depth of the place, or the thickness of the part; as *Hippocrates* in his sixth Book, Aphorism 41. doth rightly advertise us.

Signs of corruption and induration.

Signs of maturation (which is nothing else but a ripening of crude or raw matter) now nigh at hand, are, a blackness, or a Leaden colour of the part affected. A sign of Induration is, a diminution of the Tumor, but an augmentation of its hardness. A sign of the Tumors retreating and decreasing, is a sudden and unexpected lessening of the swelling; which said diminution if it proceed from an internall cause, is evermore evill; unless the matter retiring be evacuated by a fit and convenient way. Upon the going back of the matter immediately there follows a Feaver, if there were none before; or if there were any before, it is now much augmented; and other evil symptoms arise from the retention of the matter in the Body.

Now the best way of freeing the part of any Tumor that grieves and afflicts it, is that which is performed by resolution; and next unto this, that which is wrought by suppuration; but it is very il, that Tumors or swellings should be hardened; and it is far worse, nay worst of all, that the part it self should be corrupted.

The Cure.

The nature of a Tumor or swelling in it self simply considered (*i. e.* as it is magnitude augmented) affords no useful indication at all; but it is taken from the Cause conteining; for upon the removal of this, forthwith the swelling vanisheth. If there be a distemper accompanying it, then for the better effecting the Cure, it is expedient in Tumors that are hot, that we use means to cool them; if they be cold, that we heat them; if moist, that by the help of Art we exsiccate and dry them; and lastly, if they be dry, it is requisite that we should moisten them. But then, in this alteration of the parts, their Nature, Temper, Action, Use, Figure, Scituation, and Sense (al which prescribe the measure of alteration) are carefully to be considered; of which I have already treated at large elswhere, in my Institutions, the fifth Book, second part, second Section, and first Chapter.

the Causes of a tumor how to be taken away

In the removal of the Cause, we must heedfully look whether the Tumor be already compleated, and not like to receive any further increase or addition; or otherwise whether it may not be further augmented. For if the Tumor be already arrived at its perfection, then there is no more required but that we look back unto the conteining Cause, and then that we take the best course to remove it. But if the Tumor be not already at the heigth, but only in a tendency thereunto;

unto; we must then also look back a little further unto the Antecedent Cause, as likewise the Causes more remote, and those al of them we ought speedily to remove. And this is especially to be done whenas the Tumor is generated from an afflux of humors. For in this kind of Tumor the fluxion it self is to be opposed, and if possible, all its Causes to be taken away. Now the Fluxion may be totally removed, if the flowing humor be either evacuated by drawing of Blood, or by Purgation; or if the course of the flowing humor be turned another way; which is effected either by drawing it back unto the contrary parts, or by intercepting the motion of the humors in their passages or by repulsing of them from the part affected; or lastly, by deriving of them unto the parts adjacent.

A Fluxion, how it may be taken away.

Now the Causes of a Fluxion are taken away, if we take away all such things as conduce unto either the transmission, or the attraction of humors; for in one of these two waies a Fluxion is both begun and carried on. The aforesaid transmission is caused, or at least much furthered, when either the whole, or some part stirred up and provoked either by the over great abundance, or by the quality of the humors, or by both together, drives forth what is burdensome unto it unto some other part that is weaker, and thereupon the more proclive and apt to receive. And therefore whatsoever is oppressive either of the whole, or of any particular part, it behoves us to discharge and remove it, by opening a Vein, or by purging, or both waies; and then to corroborate both the part which breeds, and the part likewise that collects and receives these vitious humors; that so we may hereby free them of all their Obstructions. Attraction is caused by reason of Pain, or Heat; and therefore it is mainly requisite that the pain be removed, and the heat qualified by refrigerating Medicaments. But if the matter of the Tumor or swelling be gradually and by little & little heaped up, then the Cause of this congestion (whether it be a distemper, or any other fault in the part) is to be removed. All which shal hereafter in the peculiar Tract of Tumors be made more manifest.

A Humor how to be taken away out of a tumor.

As for so much of the Tumor as is already caused, it is to be annihilated by freeing the part affected from that very humor which excites the Tumor. Now the humor is taken away out of the affected part, either by translating of it unto some other part, or by the evacuating of it out of the Body. It is transferred into some other part, either by astringents and Medicines that drive back, or else by Medicaments constringent, that is, such as by compression bring the part close together; or otherwise by drawing of it unto other parts, which is effected by the sense of pain, by heat, and by reason of a vacuity or emptiness. Such things as repell and drive back (as elsewhere hath been said) take place only where the matter is not as yet impacted and stuffed into the substance of the part, but only flows to and again in the greater or less Vessels of the same, or else without these Vessels in the vacant spaces of the part; and which is neither so thick, nor yet so thin, that it can resist the repelling Medicines. But if the matter be already farc'd into the part, that it is now neither possible not safe to repel and drive it back from thence (of which we have spoken in the fifth Book of our Institutions, Part 1. Section 1. Chap. 8.) then in this case, repulsion hath no place, neither is it to be attempted. The peccant matter is evacuated out of the Body, either sensibly, to wit, when it is even sensibly poured forth of the parts, or else insensibly, when the matter is dissipated by the Pores.

A Humor, how to be driven back.

Discussion of Humors.

If there be no great store of matter, and the part scituated above it be less compact, and the matter it self not so extraordinarily thick, then it is to be expel'd by insensible discussion. But then notwithstanding if the matter to be scattered be any thing hard, it is first of all to be softened, that so it may the more easily be discussed by the pores of the Skin. But then again on the other side, if the matter conteined in the Tumor be in greater abundance, and withal thick; and if the part lying above it be close and compact, the matter is then rather to be sensibly evacuated by opening the Tumor.

But since that all these things are most conspicuous in inflammations, therefore whatever may here seem fit and requisite to be spoken in general touching the original of Tumors proceeding from the afflux of humors, we wil hereafter treat of in the Cure of an Inflammation: and at present we wil here (as in the fittest place) speak something in general of Impostumes.

Chap. 3. *Of Impostumes.*

FOr oft-times it comes to pass, that the matter which is cause of the Tumor cannot be insensibly dispersed, but that it wil rather admit of a change into some other kind of matter, and so be heaped up in a peculiar place. The which although it most an end happen in Inflammations, yet notwithstanding other Tumors also (and those not a few) in process of time are turned into Apostems, or Impostumes as we term them. For albeit corrupt matter proceed only from Blood, as we shal further shew in the fifth Chapter, when we come to speak of an Inflammation; yet notwithstanding, if in like manner also (in other Tumors) the matter which causeth the Inflammation may not insensibly be dissipated, Nature that is never idle (especially when assisted by the warmth of Medicaments, and most of al if any portion of Blood be therewith mingled) in process of time converts it (and that very variously according to the nature of the humor) into something like

like unto matter; which when it is altogether severed from the parts conteining, and gotten together into the Cavity of the part affected, is properly called an Apostem; as hath already been said in the beginning of the first Chapter. And in truth the name of an Apostem and Impostume is commonly made use of for every kind of Tumor; but unfitly as is aboveſaid, Chapter first. For an Apostem and *Abscessus* or impostumation hath its denomination from parting asunder, in regard that the conteining parts which before touched one the other are now mutually departed asunder, and form a certain Cavity, into which the corruption betakes it self; and likewise an *Abscessus* or Impostume is the collection of the filth and purulent matter in the hollowness of any part whatsoever. *Pliny* gives to Apostems the term of suppurations, in his twentieth Book, and third Chapter; *Avicen* cals them *Dubellet* or *Aldubellet*.

An Apostem:
An Impostume:
An Impostume what it is:
Suppuration:
Dubellet:

Impostumes their Differences:

Tumors some of them more speedily, others again more slowly attain unto their maturation or ripeness. Those that proceed from good Blood, and especially in a fleshy part, are easily and soon maturated: but those Tumors which are bred out of other humors, and have their residence neer unto the Joynts, and in the sinewy parts, those especially that are weak and have in them but very little native heat, are with far more difficulty brought unto a maturation. Now of the matter which is gathered together in an Apostem, there is great variety according to that of the humors. Out of good Blood is generated a filth that is less offensive; but out of the other humors is bred somthing that resembles matter, Green, Yellow, or some other color, Pricking, and Stinking. For as for this preternatural matter, if it may not be driven forth, Nature then separates it from the parts conteining; and thus being severed from the other parts, Nature collects it into one place, and there digests it so far forth as the nature of the subject matter doth admit.

And indeed of the matter that is discovered in Impostumes there is evermore great variety. For there is not only that which we cal *Pus*, *i. e.* a stinking Corrupt matter found therein, but likewise now and then a substance resembling Gruell, Honey, Suet, the Lees of Wine, the Dregs of Oyl; and somtimes also never a whit unlike unto Honey and Snivel blended together; and that oftimes of so ill a savor, that no one is able to abide the Stench: and as soon again also we may therein discern substances like unto Hairs, Nails, Bones, Stones, Worms, Wood, Coals, Cockleshels, as before also (in the beginning of the second Chapter) we have acquainted you. Yea moreover also in Impostumes not unusually there are found Worms alive, and other such like little Creatures that have life; and *Philoxenius* writes (as *Aetius* reports, *Tetrab.* 4. *Serm.* 3. Chapter 7.) that on a time he discovered in a Tumor opened living Creatures like unto Gnats, or smal Flies. And it is a wel-known truth, that the humors in the Body may be wholly changed and converted into Worms, and such like substances in great variety. But then if Coals, Woods, Shels, or any thing else of a like nature (into which the humors cannot possibly be conceived to pass) and more especially when they resemble any thing that is feasible by Art) shal chance to be found in Tumors, then without doubt we ought to ascribe it unto Sorcery and Witchcraft. And this likewise (as touching the difference of Impostumes) is to be taken notice of (the same that *Galen* tels us in his fourteenth Book of the Method of Physick, and twelfth Chapter) viz. that the matter into which the humor causing the Tumor is converted, one while flows to and again in the Cavity of the Tumor, and is gotten together into the nook thereof; and as soon again it is shut up in its own peculiar Membrane, as it shal further be made to appear when we come to treat of the Tumors we cal *Meliceries*, *Atheroma*, and *Steatoma*. Albeit there have not been wanting some (as we may read in *Paulus Ægineta* in his sixth Book, and Chap. 36.) who were of Opinion, that those Tumors alone were to be properly termed Impostumes, that did participate of an Inflammation and Pain, and had within them a sharp and corroding humor; and were not at all conteined in their own peculiar little Skin or Tunicle.

The Signs Diagnostick.

Now then in an Inflammation it may easily be discerned when the humor that causeth the Tumor is turn'd into a purulent matter. In other Tumors notwithstanding there are Signs given which may demonstrate whether or no they be changed into an Impostume. As to instance, Until that the Tumor be turned into an Impostume, it is never a whit lessened, but there is perceived a more intense beating in the part, the Heat, Pain, and the other symptoms are heightned; hence it is that *Hippocrates* in the second of his Aphorisms, Aphor 47. writes, that til the time of maturation the Pains and Feavers are intense. And besides some one part or other of the Tumor begins to be sharp-pointed, the matter then seeking its passage forth and thereby lifting up the part into a Tumor.

Signs of suppuration.

But so soon as the humor is converted into Snot or that kind of matter which much resembleth it, then, and not til then, there is an abatement of the Feaver and pain, and then the swelling round about is somthing diminished, the extension

tension and hardness a little remitted, and the Patient is sensible of ease and a kind of light somnes; for then in Tumors that are hot the heat is abated and becomes remiss whenas the matter is al gotten together into some one part: and hereupon the tumor it self in that part where the matter is thus collected is raised up into a sharp point. And at length, if the place be pressed down with the finger, there is a softness and a certain kind of floting of the matter underneath sensibly perceived in the part. Yet notwithstanding that we be not mistaken in this point, a Caution is very requisite. For now and then there is no fluctuation at all to be perceived, to wit, when either the matter is over thick, or otherwise, when it is scituated in a part very deep. Concerning which *Hippocrates* thus instructs us, in the sixth Book of his Aphorisms, Aphor. 41. when he saith, That for those which have a suppuration in the body really existent and in being, which yet notwithstanding appears not unto them, the reason why it lieth undiscovered unto them is in regard of the thickness either of the matter, or of the place where it hath its residence. But sometimes there is perceived to be somwhat like unto this fluctuation or floting, albeit there be no filth or corrupt matter underneath; which happeneth about the Knees, and other joynts, where there is no flesh underneath the skin.

The Indications and Cure.

Whilst that the purulent matter (by the late Latine Authors termed *Pus*, from the resemblance it hath unto Snot, or Snivel) is in the way of maturation, and until it hath perfectly attained thereunto, the heat of the part that concocts the aforesaid *Pus* or purulent matter must be augmented by Medicaments that cherish and encreate the heat of the part; or else by such Physical Remedies as are proper, to wit, those that tend unto suppuration; and by this means the production of purulency is to be holpen forward and hastened, and the present intense pain appeased. But so soon as this *Pus* or somwhat like thereunto is perfectly generated in the part, in regard that it is in its whol kind universally preternatural, and so cannot possibly be assimilated by the part, it must thereupon be cast out of the body; which may most aptly be accomplished by opening the Impostume, whether it break of its own accord, or otherwise it be opened by art. But seldom or never is the matter contained in the Impostume to be discussed and dissipated; and then it ought to be only when the matter is very thin and fluid.

Matter vulgarly termed Pus, how to be furthered.

Those Remedies that not only mitigate, but wholly also take away from the part al sense of pain, are such as we call *Anodyna*, and *Chalastica*, viz. Milk, Butter, Oyl, Swines Fat, Capons Grease, the Unguent *Dialthea*, and the Emplaster *Diachylon simplex*.

What the Nature of those Medicaments which both cause and hasten maturation, or the ripening of this *Pus*, is, we have declared in the fifth Book of our Institutions, Part 1. Sect. 1. Chap. 9. Such as are these, Oyl mingled with Water, Oyl temperate, without mixture, Wheaten flower, and Bread of the same, the Fat of a Calf, Swines Fat, Hens Grease, the Fat of a Goose, Pitch, Rozin, Wax kneaded and mingled with Oyl, the Unguent named *Tetrapharmacum*, that is, made up of four Remedies, viz. Wax, Rozin, Pitch, and Fat. In Bodies that are soft and loose, the fat of Swine; but in bodies more compact Bulls fat is most approved for use. For this is carefully to be heeded in Maturatives, i. e. Ripening Medicaments, that they ought to have in them the neerest resemblance that possibly may be unto the nature of that body whereunto they are applied. And therefore in Children, Women, and generally in al bodies that are softer than ordinary, the moister kind of Remedies take place; and on the other hand, in bodies more hard and close, Remedies of the moister sort are required. And this in like manner is to be understood touching the Nature of a tumor or swelling. As to instance, in Inflammations such Remedies as moderately heat and moisten (provided alwaies, as I said, that they be temperate) are used with the best success. And yet notwithstanding, because that in some other Tumors naturally more cold there is a maturation, though more slow; and the matter of them being thicker than ordinary, if it be not converted into a laudable *Pus* or Quittier, yet it is turned into a matter neer of kin thereunto; and the heat of the part although it be greatly furthered and carried on by temperate Maturatives, yet can it not ripen the cold matter; upon these aboveseid considerations, Medicaments that are experienced to be somthing hotter are to be added unto the former. The same is likewise to be observed in parts naturally cold, as also in old age. And hence it is that of such Remedies which ripen the crude matter in Tumors, we constitute two kinds. Of the former sort are all those that are moderately hot and clammy, which are of use in hot Tumors; and these are properly such as are said to further and hasten Maturation; of which sort are those before recited, *Hydrelæum*, sweet Oyl, Wheaten Meal and Flour, Milk, the Pith of white Bread, the Fat of Swine, fresh Butter, Wax mingled with a double quantity of Oyl, Mallows, and Marsh-mallows decocted with Oyl, the Mucilage of Linseed, of Fenugreek, of Mallows, and of Marsh-mallows. If any desire a Composition, let him make such an one as this that followeth:

The Differences of Maturatives.

Take *of the pouder of the Root of Marsh-mallows, the Leaves of Mallows, of each one ounce; of Wheat flour an ounce and half; of the seed of Fenu-*

Fenugreek, and Linseed, of each half an ounce; of Saffron half a dram; boyl them in the Decoction of dried Figs, or in Milk; add hereunto of the Fat of Swine, and the Unguent Dialthea, *of each one ounce; and make herewith a Cataplasm.*

Of the second sort are such as are somwhat hotter; which are to be used in cold Tumors, and in colder Natures, because there the parts likewise are colder; and such are, Turpentine, the Gum of the Fir-tree, the Larix-tree, and the Pine-tree, dried Figs, Raisons, Fenugreek seed, Linseed, Onions roasted under embers, Leaven, Oyl of Chamomil, and Oyl of white Lillies, the Fat of an old Hen, old Butter, *Bdellium*, *Galbanum*, and *Ammoniacum*.

Out of which such a like Cataplasm as this may be made:

Take *of the pouder of the Roots of Marsh-mallows, Wheat flour, Linseed, Fenugreek seed, dry figs pounded to a Mash, of each two ounces; of Leaven half an ounce; of the pouder of Chamomile flowers two drams; let them boyl in a sufficient quantity of Water; then add thereunto of the Fat of an old Hen, and Oyl of Camomile, of each an ounce and half, and so make up a Cataplasm.* Or,

Take *the Leaves of Marsh-mallows, the roots of white Lillies, Holy-hock Roots, of each an ounce and an half; Onions one ounce; boyl them to a softness, then mash them and pass them through a hair sieve. Add hereto of Wheaten flour, Linseed, Leaven, of each one ounce; Turpentine half an ounce; of Saffron half a dram; Oyl of Camomile, and Hens fat, of each a sufficient quantity; and so make a Cataplasm.*

The most usual are, the Emplaster of Melilot; and *Diachylon magnum*, with Gums.

The Evacuation of stinking and corrupt matter.

When as the corrupt stinking matter is arrived at its full ripeness, or the matter of the Tumor is changed into an humor resembling this *Pus* so often mentioned, it is then to be evacuated, and cast out of the Body; the which since it may be effected in a twofold manner, either sensibly, or by an insensible digestion; the best course were (more especially in the face, lest that a Cicatrix or scar should ensue and remain upon the opening of the Tumor impostumated) to discuss and scatter abroad the matter by an insensible transpiration; for which very purpose certain Medicaments are described by *Galen* in his sixth Book of the composition of Medicines of the second rank, the 14, 15, and 16. chapters; and there you may see them. But it is not often that this happens; and when it doth, there is cause to fear, lest that if there be great store of corrupt matter, some part thereof should be left remaining and hardened; or that if the filth aforesaid be acrimonious and corroding, that then it may be rendered more sharp by delay, and the application of Remedies that are hot; and so by this means the part affected, as also the parts neer adjoyning should be greatly hurt and injured; and therefore for the most part the safest way is to open the Apostem, if it chance not in a convenient time to be opened of its own accord.

The opening of Apostems.

Now then an Impostume is to be opened in the highest and most eminent place, where the skin usually is at the thinnest; but then notwithstanding the incision must be in that place of the part affected which is most sloping, that so the passage forth of the corruption may be rendered the more facile and easie. Now the opening thereof is effected either by some Caustick Medicament, or else by the help of an Iron incision knife. But most an end the safest way is to open the impostume with an Iron Instrument rather than by a Caustick Medicament. For Medicines most commonly protract and delay the Cure, excite and cause both heat and pain in the part; whereupon it happeneth that the temper and constitution of the part, which was before much weakened by the Disease, becomes now wholly subverted; and from hence dangerous symptoms do frequently shew themselves. Now and then notwithstanding, as for instance, in the watery Tumor of the Testicles, when with the Iron we cannot easily penetrate unto the bottom of the place wherein the vitious matter is contained, we ought to use a potential Cautery. For the way being once opened by a potential Cautery may afterward be dilated as much as we see cause for; that so the Instrument may the better pierce the part, and reach even unto the deepest place, and bottom thereof.

How many waies a tumor may be opened.

The said operation with an Iron is effected whenas the opening is made by an Iron Instrument made red hot, or else with an Iron Incision knife that hath not been heated in the fire. We very seldom make use of the hot Iron, and then never but in cold tumors; and that also only whilst the impostume is in those parts that have in them either many, or else large Veins and Arteries; that so the flux of Blood (which we cal the Hemorrhage) may the better be pre-cautioned and prevented. But as for the Incision Iron that hath not been heated, we use it most frequently, and that with very good success. But if it shall so happen, that upon the opening of the Impostume, sometimes pain, and sometimes an efflux of blood shal ensue; and likewise that by reason of the abundant evacuation of the matter; or else that by pain and fear, a sinking away or swooning should follow; in this case we must endeavor that the Section may be performed with the greatest speed, and the least pain that possibly may be. If an Hemorrhage be feared, we must have in a readiness those Medicaments that stop the flux of

Blood,

Blood, as Frankincense, Aloes, the white of an Egg, Bole Armenick, Pomegranate flowers, Dragons blood, and the like. To prevent fainting and swooning, especially in Children, Women, and other fearful persons, we ought to have at hand such Medicaments as are in use against this faintness of mind. As also that there may be a right and orderly proceeding in the Section or opening, the condition of the part, the scituation of the Veins, Arteries, and Nerves, as likewise the Nature of the Muscles, all these ought to be exactly known and learned by the Chirurgeon from what is written by Anatomists; lest otherwise Veins and Arteries should be cut, and an Hemorrhage thereby caused; or that pain should arise from this hurting and cutting of the Nerves; or that hereby the Member should be altogether deprived of sense; or lastly, that by the hurting of the Muscles the part should be wholly deprived of its motion. Moreover also, a special regard must be had unto the fibres in the Muscles, so that the Section ought to be performed according to the conduct of these fibres, that is to say, not oblickly or overthwartly; for this kind of Section wil greatly annoy the action of the part. We must again heedfully weigh and consider, in what measure, and how great the Section ought to be. For if it be over little, the *Pus* or corrupt matter, especially if it be thick and cloddy, wil have no passage forth without compression of the part, which wil both assuredly excite pain, and beget a kind of brawny hardness in the part, which may be the cause of a Fistula. And on the other side, if the section be made overgreat and wide, there wil then be left remaining a great and unsightly scar; and which is worse, the ambient Air getting in wil alter the part: and therefore the Section ought to be made in such a manner and measure, as shal be most requisite for the evacuation of the Corruption and filth. And although the section be somwhat with the least, it may notwithstanding very easily be dilated by thrusting a tent into the hole thereof. To make the Incision we admit of either the Razor, or the Knife of Myrtle wood edged on both sides, with which the Italians and French open Veins; or else that Knife which we cal *Phlebotomus*, which the Germans use; or lastly, that which we cal *Syringotomos*, an Instrument crooked, and of use only in the incision of an internal, or a concavous body.

The opening of a Tumor in what manner to be performed.

The evacuation of the Pus, *or corrupt matter*

The incision being made, if there be but little filth, the part is with the finger to be prested down, to the end that it may the more readily flow forth: but if there be great store of this filth and matter, it is then to be drawn forth leisurely, and by little at a time, lest haply (if it should be evacuated al together, suddenly, and on an heap as it were) much of the spirits should therewithal exhale, and thereupon a fainting and swooning should ensue.

After Incision, and the emptying forth of the corruption, it will be convenient the first day to strow thereon the dust of Frankincense; on the second day to lay thereon some kind of Digestive or other, that so if any thing yet remain undigested, the compleat digestion thereof may hereby be accomplished. And if there be present any filth, or any kind of uncleanness which may hinder the growth of flesh shal chance to occur, they are forthwith to be wiped and cleansed away. As for example:

Take *Turpentine one ounce; Honey of Roses half an ounce; and of Barley Meal as much as is requisite, and so make a mixture, and use it for the purpose aforesaid.*

If the Ulcer require yet a more forcible cleansing by reason of its extraordinary nastiness, then we ought to use the stronger Abstersives, as *Unguentum Apostolorum, &c.* And at length Sarcoticks, that is, such Medicaments as cause flesh to breed and grow, are wisely to be applied; and the orifice of the Ulcer to be shut up with a scar.

Of Impostumes lying hid, two histories.

Here we are to take notice, That sometimes Impostumes may for a long space lie hid not only underneath the external Muscles, but likewise under the more profound, yea, and the more internal Muscles also. Concerning the Impostumes of the Muscles of the lower belly or Paunch, we have already spoken in the third Book, Part 10. Chap. 7. As touching the Impostumes in the great Muscle *Psoa*, *Gulielmus Fabricius* in his first Century, and sixty third Observation, relates two Histories: And first he tels us, that a certain Matron took her bed, complaining of acute and extream pains about her Loyns, which was accompanied with a Feaver, swooning fits, and difficulty of making water. And when it was sufficiently understood by the kind of the pain, and other signs and tokens, to be an inward Impostume (for outwardly there appeared not any thing, neither could there any thing be discerned by the touch) and that this Apostem could be no where but under the *Psoa* Muscle; and when that the sick party was foretold the extream danger and hazard of her life, unless the Impostume were opened, and the humor caused to flow forth; both her self and her friends gave their consent, that on one side of the *Spina dorsi*, or back-bone, the skin and the exterior Muscles even unto the *Psoa* Muscle should be opened by an Incision with a Razor: which was done accordingly, and out there flows a purulent and stinking humor, and so, after that some certain cleansing and abstersive Medicaments had been for some few months applied, she became perfectly recovered. The other History which he relates, is this: In the Year One thousand five hun-

hundred eighty five, a certain yong man, aged twenty seven years, or thereabouts, as he was descending from the highest pitch of the Mountain *Cinecius* unto the lowest part thereof, not well minding his footsteps in a very steep path, he or ever he was aware fel or rather tumbled down backwards; and that which added unto the mischief of the fall, was this, the hilt of his Sword lighting under the short Ribs and the left Kidney exceedingly crushed and bruised his Loyns. After this his fall, for a few daies at the first, the pains he felt were not many; not long after he grew sensible of pains in the left part of his Loyns, but they were as yet very gentle and remiss: now from hence forward these never left him, until at length by an insensible and gradual growth they arrived at the heighth of their increment, insomuch that at length they became extreamly sharp and intollerable. Upon this immediately follows the loss of sleep and appetite; whenas notwithstanding at that very instant the sick party was not afflicted with any great thirst, or very violent Feaver. Neither was the part affected ever a whit discolored, or as we say, black and blue: nor did there at al any outward swelling appear, nor was there the least imaginable external blemish any where to be seen; but al the parts seemed to be, and indeed were what they seemed, plain and even, and in no point at al altered from their natural scituation or color. But as afterward the event it self plainly evidenced, abundance of humors from all parts of the body had met together in the Muscle *Psoa*. In the first place he was by a certain Physitian tampered withal as a Nephritick Person, that is, one troubled with the pains of his Reins; but the Doctor was much mistaken. For at length whenas no one sign of the aforesaid Nephritical effect appeared; and the sick party had not received the least benefit by what had been prescribed; he was in the next place sent unto *Johannes Griffonius*; who instantly discovered the whol grief, and the mischief that it threatened; all which he very wel knew; and likewise the danger impending from the shutting up of the noysom purulent matter in the inwards, he foretold the yong man; and that his Opinion was, it ought to be evacuated. Unto whose will the yong man giving his consent, commits himself unto the Cure. What doth this expert *Griffonius* hereupon? In the first place he takes care, that the matter which had now seized upon, and did possess the whol Region of the Loyns, should all of it be drawn together into some one place thereof (by the applications of those Medicaments which had a vertue in them powerfully to attract from on high) to wit, such a place, where the principal Vessels were but few, and where the Instruments of motion might least be harmed amidst their operation. Which his design when (ever and anon attempting the part with a Silver Probe) he wel perceived by the sense of pain attending it, that he had successfully accomplished, without any more ado he lanceth on the left side the flesh nigh unto the fourth Vertebra of the Loyns, with a fire-hot Razor, making a Wound as deep and long as is the fore finger from the end thereof unto the hollow of the hand; as afterward it was easie for him to conjecture by that long sharp tent which he put thereinto. And moreover, when he had conveyed down two of his fingers into that same Wound (to the end he might widen the passage forth) out there issueth great store of matter and stinking stuff. And then having prescribed the manner of evacuation according to the rules of Art, the Chirurgeon ordains for the Patient a sharp tent made of Silver, the which being first dipt in cleansing and abstersive Unguents, he enjoyned him to use for some months. So that by this means the lips of the Wound came close together of their own accord; and the yong man recovered his former perfect health.

The humor that flows out of an Impostume sometimes translated into other parts.

And this is likewise as a thing remarkable to be taken notice of, That Impostumes lying concealed in some places, if they be not opened, then they sometimes seek out another passage, and thereby flow forth unto some other place. And so the afore mentioned *Gulielmus Fabricius*, in his first Century, and 81. Observat. relates of a child three months old, that was sorely afflicted with an Impostume neer unto his right shoulder. But the Parents would by no perswasions be wrought upon to admit of an Incision; so that by degrees the Tumor seemed much lessened and abated. But at length it being opened, some smal and inconsiderable quantity of matter issued forth, and the Tumor by little and little became in a short space wholly extinct, and sunk away; the humor now and then a little at a time gliding downwards into the lower belly, and the genitals; by which the radical Native heat being destroyed, a Gangrene follows thereupon, and after a few daies a *Sphacelus*, and in a very short time death demands his due.

And this may suffice to have been spoken concerning Tumors in general arising from the humors. Now we wil take a view of them particularly and in their several species or kinds. Now in the first place, those Tumors that take their rise and original from the Blood present themselves unto our consideration; and among them, we shal first speak to that kind of Tumor which we call *Corpulentia nimia*, or extream corpulency.

Chap. 4. *Of extream Corpulency, or overmuch fleshiness.*

TRuth it is, that *Galen* in his Book of Tumors, Chap. 1. affirms, that Fat and Corpulent

lent men are said to be such as have a Bulk and vastness, not such as is altogether preternatural, that is, beside, above, or beyond Natures intention (much less contrary unto it) but such as may be said to be not Natural, and above that which is according to Nature. Yet notwithstanding in the very same place he immediately adds, that the excesses of dispositions which are not by Nature are therefore besides Nature; and that (in very truth) the hurting of the actions doth terminate the excesses of such as are corpulent. And therefore, since that the Bulk of the Body doth now and then attain unto so extraordinary a vastness, that Natures operations are thereby much impeded and hurt, he doth upon very good grounds (in his Book of the differences of Diseases, the ninth Chapter) reduce extream corpulency, or overmuch Fleshiness, unto the Diseases of magnitude augmented. For the same *Galen* in the place alleadged, *viz.* Chap. 9. of his Book of the differences of Diseases, reports of a certain man, one *Nicomachus* of *Smyrna*; that his Body grew to so huge and extraordinary a bulk, that he could not stir from one place unto another. And within our remembrance also, by the Pictures brought hither and here exposed unto publick view, a certain Rope-makers Wife of *Strasburg* (a City of *Alsatia*) became very wel known; who in the yeer 1613. and of her own age the 36th weighed four hundred and eighty pounds. And I my self of late daies saw here a man who weighed more than four hundred pound; yet notwithstanding this man appeared in publick: and to tel you the whol truth, in this Person Nature began to assay some certain kind of evacuation of the serous or wheyie humor by the Navel. And the very same hath been found to happen unto others also, in whom the Body hath attained unto so immense a bigness, that they could neither move, nor yet so much as breathe freely. But now in such like Persons as these, there is not an equal augmentation of all the parts of the Body (as it is in them who grow, and are naturally enlarged) but only of their Flesh, and of their Fat there is an excessive and over-great encrease.

The Causes.

The conjunct Cause therefore of this Tumor of the whole Body is the Flesh and the Fat. And here truly one while the Flesh, and otherwhile the Fat is augmented: and sometimes they are both alike encreased. But the Antecedent Cause is the over-great abundance of Fat and good Blood. And for this cause it is, that this Tumor is referred unto Tumors proceeding from the Blood. And yet notwithstanding the Reason of these is far differing from that of other Tumors arising from the Blood. For the conteining Cause of bloody Tumors is the Blood, but the conteining Cause of this Tumor is the Fat, and Flesh; and the antecedent Cause is the Blood. The rest of the bloody Tumors that are properly so called spring from the Blood issuing out of the Veins or Vessels into some othe. places; which never happeneth in this extream and extraordinary corpulency, in the which Blood is never known to fall or issue forth into other places, but it is evermore put unto the Body.

But now what the Causes may be that much Flesh and Fat should be generated, will easily and soon be discovered, if we wel consider the Causes of breeding Flesh and Fat. Now then Flesh is abundantly bred in those whom we call *Eusarcoi*; that is, Persons of a pure, untainted, and sound Flesh; yet alwaies provided, that the material cause of Flesh, to wit, nourishing Food, be not wanting; and likewise that the native virtue generating Flesh be as it ought to be, vigorous and active. That which administers matter towards the breeding of flesh is great abundance of good blood; the which to produce and generate, meats of a good and plentiful juyce, and also a due and right temper of the Liver, to wit, hot and moist, are evermore requisite. But now again that much Flesh may be bred from much Blood, it is required that there be a sound and healthful habit of Body, and a good temperament of the musculous parts in the Body; which said temperament is likewise hot and moist. Hereunto also (as we are to understand) very much conduceth an easie or idle kind of life, in the which there is not much Blood wasted; as also the suppression of their accustomed bleedings, and evacuations of Blood, especially in Women. As touching the original and increment of Fat, many and various are the Opinions and controversies among the Physicians at this very day; the which for me in this place to examin were altogether impertinent. And therefore in a word we say, that Fat is generated from the Oyly and fatrish part of the Blood, falling from out of the Veins and Arteries into the membranous parts, and there digested by the innate virtue and temperate heat of the Membranes. That great store of Fat should be bred, in the first place, the Liver is a principal cause thereof. For if by reason of its excellent and perfect temperament it doth not generate either much earthy and cold, nor much cholerick and hot juyce, but produce a sweet fat, and oyly Blood, and fil the Veins and Arteries therewith; and if this Blood be not consumed or wasted in the habit of the Body, but that it stil continue to be more cool and moist, then this Blood is there converted into Fat. Ease likewise, and the intermission of Exercise, the retention of accustomed evacuations, aliment temperately hot and moist; and generally all things which either outwardly or inwardly any waies conduce to the making up of a plentifull and temperate mass of Blood; or that have in them an efficacy in qualifying and allaying the over-intense heat of the Blood of the Entrails, and of the habit of the Body. Hence it is that *Galen*

hath left it upon record; that all Bodies tending towards a cold and moist temperament become Fat. And with this of *Galen* agreeth what *Prosper Alpinus* in his Book of the Egyptian Physitians, Chap. 9. hath written; his words are these, The Bodies of the Egyptians (saith he) are hot and dry, in regard that they live under the hottest (and withall dry) position of the Heavens: but because they moderate and lessen this heat and driness by their dayly drinking of water, by their continual use of meats that have in them a cooling virtue, and likewise by their frequent use of Baths which they make for themselves with sweet Water; their bodies hereupon become extraordinarily fat, so fat, that he never beheld in any part of the world in so great a number and generally such extream fat and gross Persons as he saw at *Grand Cayre* in *Egypt*. For he reports that very many of them are so exceeding gross and corpulent, and generally so fat in their Breasts, that they have Paps of a far larger size, and thicker than the greatest that ever he had observed in any Woman. Other things there are which demonstrate unto us the truth of this assertion, to wit, that a hot temperament of the Liver makes very much for the breeding and augmenting of fat. For I my self knew a Person of Honor, who after he had been sick, and was recovered of a malignant Feaver, grew to be so extreamly fat and gross, that he could very hardly move, or stir himself in any place where he sat; and as for the bulk of his body, he came never a whit behind him whom we have formerly mentioned.

Signs Diagnostick.

As concerning Corpulency therefore, it is sufficiently obvious to every mans Eye. But then, whether or no it only produce some kind of deformity and be no more then a Symptom; or else whether it be not to be accounted a Disease or preternatural affect, the hurt and offended actions wil evidence unto us; of which we wil now speak.

Prognosticks.

1. What the inconveniencies and discommodities are that this over-great fleshiness or (as we term it) extream Corpulency carries along with it, I shal give you an account thereof in the words of *Avicen* that expert Arabian Physitian. For thus he, in his fourth Book, Part 7. Tract. 4. Chap. 5. Superfluous fat (saith he) is that which hinders the body from and in its motion, walking and operation; and streightning the Veins with an undue and dangerous constriction: whereupon it oppilates and stops up the passages of the Spirit, so that hereby it is many times extinguished; and for the same reason likewise it is that such Persons have no refreshment from the breathings in the ambient Air, which finding the passages obstructed, proceeds not so far as the *Præcordia* (or Entrails) to moderate and qualifie their excessive heat: and they are in continual fear, left that their Blood should again be driven forth unto the streightned place. Whereupon haply they wil give way that a Vein be suddenly opened, which may prove very pernicious unto them. And truly in this kind of disposition there happeneth unto them an extream & dangerous constriction or streightning of their breathing, & a beating of the Heart. Hereupon they are evermore exposed to a sudden death; and especially those of them that are fatned in their younger daies; for these have alwaies their Veins very smal, and much streightned. And they are likewise exposed unto the Apoplexy, and Palsie, and throbbing of the Heart, and the Flux *Diarrhœa*, by reason of their humidity; they are also subject to fainting and swooning fits, and the worst sorts of Feavers; neither can they away with fasting or thirst, by reason of the constriction of the passages of breath, the vehemency of the cold of their complexion, their smal store of Blood, and the abundance of their Phlegm. And to this moreover may be added, that they are (whether they be Men or Women) issueless and barren; the Male being not able to Generate, nor the Female to produce the *Embryo* in the Womb. As also their Seed is little or none at all (to wit) because it is concocted, through the imbecility of the heat; although there may be store of Seed in regard of their humidity or moisture; yet notwithstanding such as is watrish, and (in *Galens* judgment) thin, and unmeet for Generation; or if it be generative, it is of Females only. And the like may be said of Women, that those of them which are fat, do not conceive, or if they do now and then conceive, they forthwith miscarry; and lastly, their appetite (to wit that which is natural) is exceeding weak. Thus far *Avicen*.

2. The truth is, that the Cure of this affect may be hoped for; but it is wont to proceed but very slowly; neither is it to be compleated in a short time, and it is mainly requisite hereunto that the Patient be, as we say, morigerous, and in all points ready and willing to submit.

The Cure.

The Cure of this Tumor consists in the removal of the Cause which is an over-great store of Flesh and Fat. Now this abundant flesh and fat is taken away, by wasting and annihilating what is already generated, and then by taking a course that it may not again be multiplied: and this may be done, if we take care that too great an abundance of Blood be not bred; or that which is already in the Body, that it be by degrees wasted and lessened. Both these intentions are accomplished by those things that heat, and exsiccate, or dry much. For whereas the Liver, if it hath a gentle, remiss, and temperate heat, generates great plenty

plenty of sweet and Oyly blood, and so continually foments matter for the breeding of much fat and store of flesh; if now this temperate constitution of the Liver shal be altered, and the Liver rendered more hot & dry than formerly; then instead of good and laudable, I mean, fat and oyly blood, it generates that which is hot and cholerick, or that which is serous, wheyish, & watterish. And thus it is that Medicaments hot and dry do both retard the propagation of an abundant and oleaginous blood, and also they waste, and by degrees consume the fat that is there already bred throughout the body. But then for the wasting or lessening of the flesh already bred, those Medicaments are the most prevalent in which siccity (or drineſs) is predominant, and the heat in a mediocrity. By what hath been said you cannot but understand, how that in curing this affect we ought heedfully to observe, whether it be the flesh, or whether or no it be the fat that offends in the excess; and so accordingly fit and proper Medicaments are to be made choyce of: and as for such as are undoubtedly exceeding ful of flesh (and such generally are al those that have the constitutions and habits of Wrastlers) we are not to prescribe unto them such Medicaments as either cause or encrease heat, but only such as meerly dry and attenuate; and such are, Venesection, *i. e.* Blood-letting, Purgation, abstinence from food, and frictions, or rubbings. In fat persons we may notwithstanding properly enough make use of Remedies that are of a heating Nature; but yet so as that in the administring of them we be very circumspect, lest that by the overmuch heating we procure some other Disease.

And therefore when as the blood administers matter for the raising of an abundant store of flesh and fat, it is to be forthwith evacuated and diminished. And for such as are ful of flesh we may safely enough exact a more liberal and copious evacuation of the blood, yet alwaies provided, that the evacuation be not prosecuted unto the extream, as *Hippocrates* cautions us, in the first Book of his Aphorisms, Aphor. 3. But in those that abound with fat, this letting out of the blood ought to be more sparing, since that fat persons are more propense unto cold distempers. Cupping-glasses also either with or without scarification are very useful and proper for both the one and the other. Frequent, rough, and hard frictions of the whol body are likewise chiefly convenient. *Pliny* in B. 11. Chap. 37. writes, That the Son of *L. Apronius* (who had been *Consul*) was contented to have his fatness drawn away from him, thereby to alleviate and lighten his body (til then immovable) of some part of his burden. But no man wil easily admit of so desperate and barbarous a Remedy; and therefore I forbear to speak any thing more concerning it. Exsiccating or drying Baths, whether taken by drinking, or made use of for the bathing of the body, are in this case of singular benefit. Frequent purgations with Aloes (unto which may be added Mirrh and Nitre) are here likewise very convenient; and consequently the Pills *de Tribus* must needs be a proper Remedy. Such are also al bitter and hot Medicaments administred, as namely, Wormwood, Myrrh, Frankincense, Rue, *Oxymel simplex*, and *Oxymel compositum*, *Oxymel of Squils*, the Syrup *de duabus* and *de quinque radicibus*; and generally al things that provoke and expel Urine. Wherefore the roots of Asparagus and Fennel, and of Parsley, and such like, ought very frequently to be used. This Pouder likewise is much approved of, and commended; viz.

Fat drawn out of the body of one extreamly fat.

Take *Salt of Nitre one dram*; *Allum two scruples*; *Myrrh, Frankincense, the Rind of the Wood Guajacum, the Root of Sarsaparilla, of each of these two drams*; *and so make a Pouder*: Of the which let half a dram be administred in the morning for two months together. Also the Salt of Vipers is very effectual for the purpose aforesaid.

The Diet.

As concerning the Diet in this case, take this for a brief Directory. Let all the Meats and Drinks be such as render the lower belly loose and slippery, or as we use to express it in one only word, Soluble; and in the next place, let them be such as are easily concocted, but withal such as afford but little nourishment. Let their Wine be thin, and wel diluted, *i. e.* made smal with Water. Much fasting, and a more than ordinary frequent abstinence from food; and in a word, a continual spare diet exceedingly furthereth the diminution of Corpulency. Let them likewise accustom themselves to much and often exercise of the body, by al means carefully avoiding a sedentary life. And *Galen* tels us, in his 14. Book of the Method of Curing, and Chap. 15. (where he professedly treats of the Cure of extream fatness and Corpulency) that he on a time perfectly cured a man aged about fourty yeers, who was exceeding fat and gross, even to the admiration of al that beheld him; and this he did, partly by an Antidote compounded and prepared of *Sal-theriack*, against the affects and diseases of the Joynts; and partly likewise by the administring of the right *Theriaca* or Treacle made of Vipers; as also by an extenuating Diet after it; and for his exercise, swift running was enjoyned him. He saith moreover that he fitted and prepared this person for this exercise of running, by a gentle and easie chafing and rubbing of him with hard and rough rubbing-cloaths made of new linnen cloth, until the skin became red; and then immediately upon the rubbing he anointed him with an Oyl that had in it some digestive Medicament; and

this Oyl the party was also to use (as abovesaid) after his running, and more than usual exercise.

Chap. 5. *Of an Inflammation.*

BUt now that we may come to treat of Tumors properly so called (arising from the blood) those Tumors are indeed wondrous frequent, and they appear very commonly, in regard that they proceed not only of and from themselves, but they likewise happen and follow upon divers other affects, as Wounds, Fractures, disjoyntings, and the like. And this Tumor from the Blood is by the Grecians named *Phlegmone*, by the Latines an Inflammation. But now the word *Phlegmone* hath been very variously and in a far differing sence made use of by the ancient Physitians, and those of later standing. For with *Hippocrates*, and generally al the Physitians before *Erasistratus*, the word *Phlegmone* was used to signifie al sorts of *Phlogosies*, that is, every kind of extraordinary heat exceeding the bounds and transcending the limits of Nature, although it be without any afflux of matter, or any kind of swelling whatsoever. But after *Erasistratus* his daies, the word *Phlegmone* was accustomarily used to denote those Tumors alone in which there was not only a vehement and fiery inflamed heat, but likewise also therewithal a certain kind of renitency or resistance, and a beating in the part, with a more than ordinary redness of color; all which last mentioned Species of Tumors *Hippocrates* was wont to call *Oedemata sclera* and *epodyna*, that is to say, hard, callous, and painful swellings; as *Galen* hath observed in his second Book of the difference of Respiration or breathing, Chap. 7. and in his Book 3. Chap. 5. upon the fift Book of *Hippocrates* his Aphorisms, Aphor. 65. and in his fourth Book of the Course of Diet in acute Diseases, Tome 21. Comment. 3. upon *Hippocrates* his Book of Fractures, text 5. and elsewhere.

The subject of an Inflammation.

But now that we may make it apparent and manifest what an Inflammation is, and how to be defined, we wil in the first place exactly weigh and consider the subject and cause thereof; for as for the form thereof, it is of it self sufficiently evident and perspicuous. *Galen* in his Book of Tumors, Chap. 2. expresseth the subject by these terms, *Maria sarcode, partes carnosas*, that is to say, fleshy parts. For he there tels us that the word *Phlegmone* ought to be used concerning those parts which are affected with a greater swelling than ordinary, and which are ful of flesh, stretched forth, resisting, grieved with a beating pain, and therewithal somwhat reddish.

whether the flesh alone may be inflamed.

Which Assertion of his notwithstanding seems to have in it somthing that is very doubtful, and that may wel be questioned. For a *Phlegmone* happeneth likewise unto the Membranous parts; as to instance, in a Pleurisie, the Membrane that girts about and encompasseth the Ribs is inflamed; in the Phrensie, the Membranes of the Brain; and so in like manner, the smal Vessels and Membranes of the eyes suffer an Inflammation in the affect which we cal *Ophthalmia*, or an Inflammation in the uppermost skin of the eye. Neither are (besides the flesh) only the Membranous parts subject unto Inflammation; but also the glandulous or kernelly parts are often inflamed and swollen up by reason of the blood flowing into them. And last of al, not only the muscley flesh, but likewise also the substances of all the other bowels (which have their flesh much differing from that of the Muscles) are oftentimes afflicted with Inflammations; as it is most apparently manifest in the Inflammations of the Liver, Spleen, Brain, and all the rest of the Entrails. And this very Truth *Galen* himself waves not, neither doth he pass it over in silence, whenas (neer about the close of the Chapter alleadged) he thus writes; But likewise also in process of time, the skin it self (saith he) takes unto it self somthing of a fluid and fluxile Nature, as also do the Tunicles of the greater Vessels, and so likewise even the Membranes themselves, in the part inflamed: and moreover also, even the Nerves and Tendons themselves in process of time are made to partake of this very same Inflammation: Thus much *Galen* himself acknowledgeth.

But now that we may the better acquit our selves in this present Controversie, we must know that by the abovesaid *Moria sarcode* or fleshy parts, we are not only to understand the flesh of the Muscles, which indeed is flesh in the most proper acceptation of the word; but we are likewise thereby to understand the several fleshes of the bowels, which we evermore term *Parenchymata*. Moreover also under the notion of a fleshy part are comprehended all the parts that are glandulous or kernelly; yea likewise even the parts that are Membranous. For these also may be said to have a flesh peculiar and proper to themselves: as *Galen* writes upon this very subject, in the 10. Book of his Method of Physick, Chap. 11. In each one of the Primary and simple parts there is, saith he, one part or portion of the substance thereof which is as it were fibrous, another that is Membranous, and a third that is fleshy. As for example, whenas a Vein hath but one only Tunicle, and that likewise very thin, we may even then and there discover many of the fibres in this one thin Tunicle, which are interserted, as I may so say, by their certain Spider-like interweavings; and unto the which the very proper substance of the Vein doth adhere, as growing thereunto. But in other parts of the Body this flesh is of a far differing nature, neither hath it as yet gotten any

common

common name. But that you may the better understand us now that we are treating of this subject, I know nothing to the contrary, but that you may term it a fleshy substance; or truly at leastwise we may call it a certain flesh peculiar and proper unto this little part; and of a differing Nature from that of the stomach, from that of the Liver, and likewise from that of the Arteries and Muscles; in al which the flesh is not one and the same, but (as I said) much differing. Thus far *Galen*. Wherefore that we may determine what the subject of an Inflammation is, we affirm it to be any kind of fleshy substance which hath Veins & Arteries which contain within them, and convey blood, the Cause of an Inflammation; and are therefore even upon this account opposite to the bones, which neither have, nor are so much as capable of receiving Veins. For in good truth, flesh is the chief and principal subject of Inflammation: yet notwithstanding the blood, if it both diffuse it self into the adjacent parts, and likewise draw those parts into a consent and agreement with it self, they may then al of them (both it & they) be truly said to be together inflamed: of which *Galen* treats at large, in his Book of Tumors, Chap. 2. where he thus writes: That al that flesh whose affection is now mainly, and in the highest degree become an Inflammation, should seem to be repleniished with a flowing of the blood, both the color and the Tumor it self demonstrate; whereupon it appears all over humid and extreamly moistened, like as is wool and a spunge. That filth and putrid matter which flows forth whenas the Inflammation hath gotten a little door or gate (as we may so term it) to cast it out by, gives a sufficient testimony unto the truth of what hath been said; and I am rightly of Opinion, that the skin it self is elevated, and extended round about, at once and together with the Tumors and swellings of those things that lie underneath it. And in tract of time even the skin it self participates somwhat of the aforementioned flux; insomuch that the Tunicles of the greater Vessels, and also the very Membranes themselves may suffer together with the part inflamed: and moreover also even the very Nerves and Tendons in process of time come to partake of this same Inflammation. Notwithstanding now and then it chanceth that the parts abovesaid (all or some of them) if they happen to be wounded, or any other way disaffected, then the hurtful distemper, I mean the Inflammation, hath its original from out of those very parts. But universally and generally there is not any thing that according to the bent of Nature perseveres to carry it self in al things exactly conformable unto the inflamed part, if there be but any the least stop put thereunto; but al things together with the flesh participate of the said flux; so that oftentimes it reacheth even the very bones, like as many times also it is by them (when they first of al are affected) much promoted and furthered. And in his sixth Book of the Method of Physick, Chap. 5. he thus writes: Neither do I greatly wonder (saith he) if somthing resembling a *Phlegmone* shal in a smal proportion chance to accrue even to the bones themselves when broken. The which likewise *Avicen* hath taught us in the 2. of his first Book, Doct. 1. Chap. 5. where he acquaints us that Tumors happen unto the Members that are soft; and yet notwithstanding that there is a time also when somthing happens unto the bones themselves, which is assimilated into the matter of a Tumor or Swelling, by the which said matter the Tumors magnitude is exceedingly heightned, and its humidity greatly augmented. And he adds the reason. Neither is it (saith he) at al to be wondered at, or ever a whit extraordinary, that that which receives an encrease or addition with nutriment should likewise receive it, that is to say, an addition with superfluity, when either it penetrates into it, or shal otherwise befal it, as generated therein. And in the species of Teeth, *Galen* in his 5. Book of the Composition of Medicaments according to the parts affected, Chap. 8. informs us, That in the Teeth those things that are redundant and superfluous may excite and stir up in them a like resembling affection, or rather passion, such as is the Inflammation that appears in and neer about the fleshy parts. Yea, possible it is, not only that the bones should get a thickness from the superfluous nourishment, but likewise that another bone should be super-added unto them, and grow up together with them. Concerning the which, *Abenzoar* in his 2. Theisir. Tract. 6. Chap. 1. hath these words: And now and then (saith he) the bones are ingrossed and greatly augmented in their superficies, either by the depraved corroding humors that are infused into the very bones, or otherwise by the thick quittor and mattery filth which passeth over upon them; from whence it is that they are hollowed, corroded, and augmented. And again afterwards he writes more at large upon this subject in these words: The bones (saith he) are somtimes greatned or (to use his own word) ingrossed beyond Natures intention, by reason of an overplentiful and gross course of Diet, it being likewise inordinate, suddenly and rashly fallen upon, and not (as rather it should have been) successively, and by degrees, advisedly entered into. And long it is not since I heard my Father say, that he on a time saw a certain man that had a bone super-added and bred in his back like unto the Harts Horn; and that it was not altogether so hard as the natural bones: and my Father himself (saith he) purged this man, and emptied forth the gross humors that were in him; and after he had so done, he then puts upon the bone certain exiccating or extream drying Medicaments; insomuch that the said bone fel forth of the body; like as the Hart casts his Horns, and

as

as other Beasts shed theirs in the Spring time. And I my self also have had a Bone growing upon my Back, which bred me extraordinary great pain: and I thereupon by Purging freed my self of gross humors, and laid upon the Bone Resolutives, or Remedies of a dissolving faculty.

The Causes.

As for the Cause of this preternatural affect, *Galen* writes that as it is altogether unknown unto the ignorant multitude of men, so it is not very wel understood by all that profess themselves Physitians. For although, as I conceive, it is agreed upon by al Physitians, that Blood is the Cause of an Inflammation, yet notwithstanding lest that (as the same *Galen* writes in the place before alleadged) we should seem only to declare our own single Opinion, without any further enquiry thereinto; we wil therefore make the more accurate search after (thereby to find out) the Cause of an Inflammation, in this manner following. There would be no Tumor at any time generated in any part of the Body, were it not that either its substance as it were boyling over with heat is poured out, or that from without some new substance makes its approach. For there are but two only causes to be assigned of the augmentation of the bulk and quantity in any thing whatsoever. For either the radical moisture through an internal or external heat is resolved into an aery substance, which (as it is wel known) requires a far greater space & room for dilatation then formerly it had; or else, as we said before, some new substance is extrinsecally from some other place superadded thereunto. Now therefore of necessity it is that one of these two causes must be present, when as in that hot and burning Tumor which we commonly call a *Phlegmone*, the part is lifted up into a greater bulk than is ordinary, or agreeable to the intention of Nature. But now, that the fervency and boyling up of the natural moisture, or the effusion thereof, is not the Cause, appears by this, because that every thing that is poured forth and converted, as it were, into spirits, when it is cooled it assumes again its pristine quantity, and (as we may so express it) puts off and laies aside the Tumor; as by common experience it is most apparent. But as for the parts inflamed, let them be never so vehemently cooled, yet wil they never return into the former state and condition, nor ever cast off the Tumor or Swelling. Furthermore, if by reason of the effusion of the part, and its conversion into spirits, a Tumor should be caused in the part inflamed, then necessarily upon the incision of the part the spirit should appear; which yet (as we see) is nothing so: but that rather there follows an effusion of Blood; and the whole place by its colour and the looks thereof seems altogether full of Blood. It remains therefore, that the accession of some new substance is the cause of a *Phlegmone*. But now that this new substance is the Blood, appears from hence, to wit, that the *Phlegmone* is exceeding red both within and without. Now this red colour is only proper unto, and inseparable from the Blood; for there is nothing that waxeth red in the Body, beside the Blood and the Flesh; which later, notwithstanding, *viz.* the Flesh, cannot by any means be the cause of a *Phlegmone*. For if the increment of the flesh were the cause of an Inflammation, there would be indeed a Tumor or Swelling in the part; yet so as notwithstanding the internal heat should remain sound, and in an healthful plight, without the least distemper; and that also it should not in the least vary its pristine nature, when as in no one thing that is augmented according to its substance the heat may properly be said to be heightned and encreased, so far forth that the increment of the substance and quantity should any way differ from the change or alteration of the qualities. But now the case is otherwise in a *Phlegmone*, wherein the colour is changed, and the heat grown to be more intense, the said colour evidently demonstrating not only the quantity, but likewise the quality of the substance. Moreover, that the Blood is cause of a *Phlegmone*, may be manifestly evidenced by this, that the place (in the greatest Inflammations especially, which now and then happen in Ulcers) appears and seems all bloody round about; which certainly would never be, if blood were not the cause of the Inflammation. Furthermore, that Blood is Cause of the Inflammation that generating of the Inflammation which happeneth in Wounds doth evidently demonstrate. For in new and fresh Wounds, the Blood (its true) at the first flows forth; but then afterward being compressed and kept in either by the hand, or else with Ligatures, or Medicaments that stop the issuing forth of blood, or else lastly being suppressed and staid of its own accord, it is then retained either in the Orifice or Cavities of the dissected Vessels, and there it is compacted, and so wrought that it grows together (like as clotted blood useth to do) and there by a continued heaping up of the blood abundantly flowing thereunto it lifts up the part into a Tumor or Swelling, and causeth an Inflammation.

Blood the nigbest cause of an Inflammation.

An Inflammation what it is.

Since therefore the Conjunct Cause of an Inflammation is proved to be the Blood preternaturally flowing thereunto, it is no hard matter thence to collect, that an Inflammation is a preternatural Tumor of the fleshy parts (as *Galen* in the place alleadged takes and understands the name of Flesh) arising from the preternatural afflux of the blood; and that therupon it must necessarily be hot, red, extended; and accompanied with a kind of renitency, or resisting property, pain, and pulsation or beating.

But

The manner how an Inflammation is bred.

But now, that there may not be left to remain any the least obscurity about the nature of an Inflammation; we will here add the manner also how a *Phlegmone* is generated; and this we wil do out of *Galen*, who in his Book touching the unequal *Intemperies*, Chap. 3. hath in these words described it: it is (saith he) a hot fluxion or flowing, the wch when it hath seized upon and seated it self in some muscelly part, at first the greater Veins and Arteries are fil'd up and distended; and next after them the lesser, and so it is carried on untill that at length it arrives even at the least of them. In these when the matter of the fluxion is forcibly impacted, and cannot therein be any longer conteined, it is then transmitted unto the outward parts, partly through their own Orifices, and partly by a percolation, as it were, and straining or sweating out of it through the Tunicles: and then the void spaces which are betwixt the most principal parts are filled full with the fluxion. And so all those parts or places are on all sides very much heated and overspread. Those parts or Bodies are the Nerves, Ligaments, Membranes, the Flesh it self, and before al these the Veins and Arteries. For whereas the Veins and Arteries run along unto each particular part (by the which is received both nourishment and vital Spirit) so long as the blood flows in a due measure, and just proportion, and is conteined within those its receptacles, the part is not wont to suffer any Inflammation at all; but then only, when at the length the blood is overcopiously and all on a huddle emptied and poured forth into the substance of the part by the Veins and Arteries. By which very thing also a *Phlegmone* is distinguished from other fluxions, in which the matter is diffused without the Veins into the whole substance of the part, and there doth distend and dilate it. For in a *Phlegmone*, although all the parts are (as I may so say) embrued with blood, yet notwithstanding there is a certain order observed, to wit, that some of the parts should sooner receive the fluxion, and others of them not til afterward; until that at length all of them come to be replenished and distended by the humor. Now this kind of order wholly depends upon the natural distribution of the greater Vessels conteining the blood. For whereas the Veins and Arteries when they first of all make their entrance into the aforesaid Vessels are evermore the larger, and by how much the deeper they are distributed therein to, so much the less they are; all this while there ariseth no Inflammation, unless it so chance that the blood be emptied forth into those smallest Veins, and again happen to fall out of them. And this that hath been said manifestly appears unto those that by an exact and accurate inspection take a right view of those very little and almost imperceptible Veins that are branched forth and extended unto that Tunicle of the Eye which Oculists usually call *Adnate* or *Conjunctive*. For these indeed do evermore convey blood unto the Eye for its nourishment, and yet notwithstanding whilest that the Eye is free from distemper they are to exceeding smal, that they can hardly be discern'd by the sharpest sighted Eye. But then so soon as the Eye is inflamed, & those slender Veins are preternaturally replenished with blood, then they shew themselves, and become very conspicuous. And it is most agreeable to truth that thus it should be also in al other Inflammations, whatsoever they be. But as yet there is no Inflammation present, albeit the lesser Veins are even filled up with blood, until that at length by and thorow them the blood be derived into the remaining substance of the parts; which may be done two waies. For in the first place, the blood is emptied forth by those very smal and most inconsiderable orifices of the Veins, by which the Veins do (as it were) gape & open themselves into the surrounding substance of the part, that so thereby the blood may through them the more easily drop forth, for nutrition or nourishment. Moreover likewise it strains and swears through by the Tunicles of the Veins: for even the Tunicles of the Veins are in like manner so framed by nature, that they are not without their pores; through which, if not the blood it self, yet certainly the serosity or wheyinesse thereof, and its thinner part is exsudated or sweated forth by a kind of percolation.

From what hath been hitherunto spoken, the distinction of the conjunct cause from the cause meerly antecedent in an Inflammation is sufficiently apparent. For the blood (which we have asserted to be the cause of a *Phlegmone*) doth in a double respect take upon it self the virtue and Nature of a cause. For either it is the next conteining and conjunct cause, of which we have hitherto discoursed; to wit, as it hath already flown into the part, and is irremovably impacted therein, so far forth that it actually elevates that same part into a Tumor: or else it is the antecedent foregoing cause, to wit, as by reason of its abounding in the body it hath a power of flowing into, and by its influx of lifting up the part into a Tumor or Swelling. The which antecedent Cause in an Inflammation, like as also in other Tumors, fals again under a twofold consideration: to wit, either in regard of the Affect simply considered as it is to follow upon this cause which it hath a power to excite, although as yet it hath no being in the body. And so a Plethory (which is an extream and overgreat fulnes of good and laudable blood) is very frequently present in the body, albeit an Inflammation doth not instantly ensue thereupon. Or else secondly, it is considerable, as preceding and foregoing the affect that already hath a being, and is already actually existent in the Body; to wit, when as the Blood now floweth to the exciting and augmenting

The antecedent cause of an Inflammation.

menting of the Tumor. Which (to speak truth) is more rightly stiled the antecedent cause, then was the former; since that this latter hath respect unto an effect already present; but the former relates only unto an affect which hapneth in the future time. But this antecedent cause, that it may flow together unto the place affected, it is thereunto moved and stirred up by other means; whilst that it is either transmitted from some where else; or else attracted by the part it self, for those very causes we have hitherto been treating of and explaining.

The remote Causes.

But now for those Causes which we commonly term Procatarctick, more remote, and primitive, they are such as either conduce to the breeding of a copious and a plentiful blood (as do al meats of good and much juyce) an easie and idle kind of life, and other such like requisites: Or else they are such as render the blood more acrimonious and sharp, as do all things that cause heat, al acid and tart aliments, wrath, watchings, stirrings, and exercises in the extreme, or else such as excite and stir up the blood to move unto the part affected, as doth the overgreat heat of the part, pain proceeding from a wound, from a fall, from contusion or beating, from a fracture, from disjoyntures, and the like causes; or else the weakness and imbecillity of the part affected receiving, compared and considered in reference to the vigour and strength of those other parts which transmit the abundant store of hot blood unto the aggrieved part. Notwithstanding, an Inflammation never happeneth to be generated by a leisurely and gradual storing up of blood; but it is evermore bred by a sudden and thronging affluence and influx of the said blood. For although it may so chance, that some kind of Humor may sensibly and by degrees be collected in some one part, which being heaped up, as aforesaid, may afterward begin to excite a certain kind of pain in the part; yet notwithstanding al this, an Inflammation is never produced until such time as the pain gives cause sufficient that a more plenteous store of blood should forthwith and very easily make its approach.

Notwithstanding we are to take notice, That although the Blood be the containing and antecedent Cause of an Inflammation, yet notwithstanding we say, that a Cacochymy, or a depraved ill digestion, and more especially sharp and cholerick humors, are the prime and principal cause that the blood be moved unto the part affected, in those Inflammations which are excited without any apparent cause, as Wounds, Contusions, and such like. For so it is, That when Nature is twinged and pulled by such like Humors, and yet notwithstanding is unable altogether to expel them out of the body, to the end that she may free the principal parts from the danger impending by reason of them, she assays to thrust them forth unto the external and less principal parts: the which when it is not able to accomplish, unless it make use of the blood for a vehicle or (as we say) a Conduit-pipe of conveyance; and that the acrimonious humor it self excites a pain in that part into which it is thrust and shut up; hereupon it is that there follows a conflux of blood unto that part, and from it proceeds an Inflammation. And much after this manner, the Pleurisie, the *Peripneumonia* or the Inflammation and Impostume of the Lungs, the Quinsie, the Phrensie, the Inflammation of the Ears and Gums, the hot Tumors or Swellings in the groins called *Bubones*, Carbuncles, and such like are generated and excited.

The Differences.

The principal Differences of an Inflammation are taken from the variety of the containing cause, and from the great difference of the blood that stirs up and begets the Inflammation. For a *Phlegmone* is said to be (for distinctions sake) either that which is a true and legitimate one, or otherwise that that is not a true *Phlegmone*, but rather a bastard and spurious one. The true and legitimate *Phlegmone* is that which proceeds from good blood, and such as is in a due natural temper, or at leastwise such as whereof there is more than ordinary store: and this is absolutely and simply termed a *Phlegmone*. But the spurious and counterfeit *Phlegmone* is that which hath its rise and original from corrupt and vitiated blood, and such as swerves from its natural temperament; and this may be occasioned two manner of waies: for if the blood doth neither lose its nature, nor change its substance; but only hath mingled together with it some other Humors, then there are three bastard spurious sorts of an Inflammation that thence arise. To wit, if Choler be mingled with the blood producing an Inflammation, it is then called *Phlegmone erysipelatodes*; if Phlegm, *Phlegmone oidematodes*; if Melancholy, *Phlegmone scirrhodes*. But if the blood change its substance, it then excites not any kind of blood-Tumor: for the blood (as *Galen* writes upon this very subject, in his 2*d* Book of the Differences of Feavers, Chap. 9.) if it be overmuch heated, and (as it may be so expressed) boyled to an extream intense heighth, then its more subtile and fat part is converted into yellow Choler; but the more thick part into black Choler, or, as we usually call it, the Melancholy humor.

The Signs Diagnostick.

The Signs of Inflammation (as may be gathered out of its definition) are, heat, pain, a swelling and stretching out of the part, a renitency or Resistance, a redness of color, and a pulsation or beating.

1. And in the first place, in this kind of Tumor there

there is present so intense a heat, that from it the Tumor hath its very name and denomination; and many indeed are the causes wherefore this heat is necessarily raised and stirred up. For first of all, the blood that through its overgreat abundance excites the *Phlegmone*, is hot, which heat it also communicates to the part affected. Moreover, whenas by the plenty of blood, and oftentimes likewise by a certain kind of thickness al the pores are so filled up and obstructed that the hot exhalations cannot sufficiently be sent forth and evaporated, neither the heat eventilated or cooled as is ought to be, the heat by retention of these exhalations and fuliginous vapors is much encreased. Unto which also a third cause may be added, to wit, putrefaction: for the blood contained in the inflamed part assumes at length a putredinous quality, by which (as is to be seen likewise in other things) the heat is excited, and communicated unto the part inflamed. And this heat is sometimes greater, sometimes less, according to the greatness and growth of those causes.

The second sign is Pain: for whereas there are two remarkable causes of pain, an *Intemperies* or distemper, and the solution of continuity, they both of them take place in Inflammations. For in truth this extraordinary heat by its distemper first of all excites pain: and then the abundance of blood by filling ful and distending the part dissolveth continuity, and thus doing is the cause of this pain. Again, the pain that is thus caused is various & much different, viz. distending or stretching out, pulling or twinging, pressing and burdening, according to the variety of the parts affected: but more especially there is present a beating pain, which likewise for this very reason is peculiarly reckoned up amongst the proper signs of a *Phlegmone*, and of which more hereafter.

In the third place, a Distension. For when the plentiful store of blood doth not only fill the Veins and Arteries, but even the whol substance of the part, all things are now distended and stretched out, but chiefly the skin; the which as it lieth round about al the other parts, and hath a Membranous substance, must necessarily partake of the distension, and the extensive pain.

4. Fourthly, Renitency or resistance, or (as the Grecians cal it) *Antitupia*, in like manner follows upon this repletion and distension. For albeit the inflamed part be not hard in its own nature, yet it is so stuffed out, and distended with store of blood, that now it wil no longer answer the touch, neither yield thereunto, but resist and withstand it; and withal it appears hard unto the touch.

5. Fifthly, the parts inflamed wax red, the blood imparting this color unto them. For there is nothing in mans body that assumes this redness of color, besides the blood and flesh.

6. And lastly, In the sixth place, there is perceived in the inflamed parts a Pulse and beating pain, to wit, when with grief and extream irksomness there is perceived a beating of the Artery in the inflamed part, which while the part was sound was not to be perceived. From whence we are instructed (as *Galen* writes in his sixt Book of the parts affected, Chap. 7.) that this beating pain doth not happen unto al the parts, but only to such of them as have in them certain notable and remarkable Arteries, and that have a part endued with an exquisite sense; and when the Inflammation is raised up unto a magnitude worthy of observation. Now this Pulsatory or beating pain chanceth from hence, that when they are lifted up and distended, the parts inflamed by reason of their store of blood do not allow nor afford a due, free, and sufficient room unto the Artery now distending it self, but that themselves are rather stretched out by the Artery lifting it self up; which said distension excites the pain. And this pulsatory pain is then most of al perceived, whenas the Inflammation tendeth toward a suppuration. For then the blood boyls as it were, and grows exceeding hot; from whence it also comes to pass, that it assumes and makes use of a larger space of room, and so much the more distends the part; by the which part the Artery is henceforth much pressed & kept down in its motion, which we cal *Diastole*; and then afterward hereupon the Artery likewise compresseth and bears down the adjacent and neer neighboring parts that lie round about it.

The beating pain how it is caused.

The Prognosticks.

In an Inflammation there are two things that it mainly and principally behoves us to presage, to wit, its event or termination, and then the exact and punctual time of the said termination. Now the Event is said to be good, when Nature overcometh the matter that breeds the Inflammation, which hapneth when either the Tumor is resolved, and the matter insensibly exhaled (which is the best kind of solution of an Inflammation) or else when the matter is suppurated and turned into that which we term *Pus*, being a thick and purulent matter. Or otherwise, secondly, The event may be said to be evil, or if ye wil, worst of all, when Nature doth not overcome and master the peccant matter; which hapneth when the Inflammation (if it be external) suddenly vanisheth and retires back to the internal parts; or when the natural heat being overcome and extinguished, the Member thereupon becomes putrified and seized upon by a Gangrene, insomuch that if it be not forthwith cut off, ruine and death it self threaten the whol body. Or else in the third place, there follows a Neutral Event (as some cal it) which is absolutely evil; when the Tumor is hardened, and when upon the resolution and discussion of

The termination of an Inflammation. which is threefold.

the thinner parts (the more thick and grosse parts remaining behind) the Inflammation degenerates into a *Scirrhus*. But now, which of these events is to be hoped for or expected, may probably be guessed at by comparing together the vigour and strength of Nature with the matter that causeth the Disease. For if the matter be not overmuch, not thick, not over deeply scituated, not shut up under a hard and thick skin; if the body be not greatly impure, and Nature be strong, then a resolution, and an evacuation by an insensible transpiration may be hoped for. But if the matter more abound, be more than ordinary thick, be contained in a deeper place than usually, and be pent up under a thicker skin, then a suppuration is to be expected. That the matter is retreated unto the inward parts may be conjectured by this token, to wit, When we perceive the Tumor to be diminished, albeit there were no repulsive remedies administred and applied, to drive back the matter. That the extinction and overthrow of the heat is neer approaching may be presaged by this, whenas the heat, redness of color, pain, and the pulse or beating is lessened, the Tumor notwithstanding still remaining; touching which more hereafter, when we shal come to treat of a Gangrene. But then lastly, an Inflammation for the most part then degenerates into a *Scirrhus*, when the matter is over viscous and clammy, and hard therewithal; and when the Natural heat being strong and vigorous, forthwith even in the very beginning of the distemper remedies that discuss and dissipate over forcibly are thereunto applied; which said remedies disperse and scatter the thinner parts thereof, and leave the thicker still remaining.

The times of an Inflammation.

That the time of the Event may be known, it is requisite that the times of the Inflammation be first of all known; and they are likewise heedfully to be observed by us (upon our knowledg of them) in relation unto the Cure. For unless the times of an Inflammation be well known and considered, we may soon run our selves into an Error, whilst we administer and apply Remedies that are any waies improper or incongruous unto any one particular of those several times. Now then, Inflammations (like as all other Tumors and Diseases) have four times or periods; its beginning, encrease, state or perfection, and its decay or declination. It commenceth or begins when the parts are repleniished with blood, and when the swelling, pain, and stretching out are encreased, this we cal the augmentation.

The state or perfection is then, when the Tumor, Distension, Pain, and all the other symptomes are most vehement, and in the heighth of their extremity. And lastly, the declination is then said to be, when the matter generating the Tumor is diminished, and the pain, heat, together with the other symptoms are become more remiss and gentle; or otherwise the matter is converted into *Pus* or purulent matter.

But the truth is, these times are some while shorter, somtimes longer; and the Inflammations are somtimes sooner, and somtimes more slowly terminated. For (as *Galen* tels us in the sixth Book of the Aphorisms, Aphor. 49.) that which is of a thinner substance is in a shorter space digested; and that which is thick or tough requires a longer time for its digestion; but that which is thick and viscous requires a far longer time. And that Inflammation which hath seated it self in the fleshy parts is terminated according to the period of acute Diseases, to wit, fourteen daies: for the substance of the flesh is more soft and permeable, by reason of its thinness. But the substance of the Ligaments, Tendons, and Nerves, being more thick and hard, and thereupon with greater difficulty receiving the fluxion, for the same cause also doth with more difficulty discharge it self thereof; and hereupon the Inflammation in those parts is the longer time ere it attain unto its state and perfection, and is not so soon curable: but yet notwithstanding the Cure is in this case seldom or never prorogued beyond the term of fourty daies; if both the Physitian rightly in al points discharge his part; and likewise the patient be in al things willing to submit.

The Indications and Cure.

Whereas the containing cause of an Inflammation is the blood, which hath preternaturally (*i. e.* beyond or besides Natures intention) flown in unto the part, the Cure is effected if that blood be removed out of the diseased part; and then great caution be had that it thenceforth flow no more unto the part affected; that so by this means, as wel the containing as the antecedent cause may be wholly taken away. For whenas the affect cannot possibly be removed, without a first removal of that which causeth it; and the case so standing, that the causes ought to be taken away in the very same order that they follow one the other in; therefore we say that the Fluxion must first of all be extirpated. Now this intention may be accomplished, if care be taken to prevent the bloods abounding in the body, and that that which is there in great plenty flow not unto the part affected; and this with most safety and speed is to be effected by opening a Vein. For by this Venesection or blood-letting the great store of abounding blood is diminished, and the same is likewise drawn back from the aggrieved place: hence it is, that there is an exceeding great benefit arising from, and following upon this opening of a vein, in an Inflammation; so that it is seldom or never to be omitted, if the strength of the patient wil permit it to be done. And indeed hardly can any other Remedies with safety in this case be applied, unless

The Cure of a fluxion or flowing of the blood.

The benefit of blood-letting in an Inflammation.

unless opening a Vein have the precedence, and the abundance of blood be thereby diminished. For if we administer remedies to drive back, the body stil continuing full of blood, it is greatly to be feared lest that the matter should not be received by the other parts, and thereupon that it should altogether attempt a flowing unto some one or other certain particular part. And as for digestives, hot as they are, if they should be made use of in a body that is full, there might be just cause to doubt lest that there should be more matter attracted then discussed and dissipated.

A Purgation. Moreover also, albeit a *Cacochymy* or ill digestion and bad nutriment be not the cause of an Inflammation; yet notwithstanding, since it is a very rare thing to find a Body that is altogether free from this said *Cacochymie*, it wil be very requisite to ordain a Purgation; which compleated, other Medicaments also are afterward to be administred, with an expectation of more success and greater benefit. And as we hinted to you before, although Inflammations take their Original principally from the blood, yet notwithstanding vitious humors very frequently give an occasion of their being, as also doth the aforesaid *Cacochymie*; and indeed herein the hot humors challenge the first place. For if by these Nature be at any time stir'd up and provoked, and it be so that she cannot of her self expel them, then she endeavors to thrust them forth by some and some unto the other parts: but when she fals short in the effecting of this also (unless she should withall transmit the blood thither) and that by an acrimonious humor sent unto the part a pain is excited; hereupon a conflux of the blood unto that same part into which Nature assaies to empty forth the vitious humor, is caused; and so consequently an Inflammation is generated. And from hence it is also, that from a *Cacochymie* there is very frequently produced a Pleurisie, an Inflammation or Impostume of the Lungs, the Squinancy or (as we use to term it) the Quinsie, and that kind of madness which we commonly call the Phrensie.

Moreover also the blood is abated, and no excessive store thereof bred in the body, if that meat be not taken in which either by its overgreat proportion, or else by reason of its substance, afford too much nourishment, and exceedingly conduceth to the generating a more plentiful store of blood than is requisite. Wherefore let the sick Person abstain from Wine, and let him use a sparing and slender Diet, which both hindreth the breeding of much blood; and if it be already over-much, doth by little and little lessen it.

But that the blood may not flow to the part affected, it may be prevented, if we deprive it of that which necessity requires that it should have to help forward and facilitate its motion; and if we likewise correct the thinness thereof, together with its overmuch aptness to motion; if we obstruct and streighten the passages through which it ought to be moved; and if we recall and draw it back from the part affected. The blood therefore, that it may be withheld from flowing unto the part affected, is to be altered, driven back, intercepted, and derived unto some other place.

Alteration of the blood. The Alteration of the blood is altogether necessary, that so, if it be overhot, thin, and fluxile or movable, it may be cooled, thickned, and rendred more unapt and less prone to motion: and this Alteration for the most part we ought the rather to procure in regard of the Feaver, which almost ever accompanieth the Phlegmone, or heat of the Liver. For it is a rare thing, that they which are infested with an Inflammation of any part should yet not be sensible of a Feaver. Wherefore we must use Medicaments made of *Succory*, *Endive*, *Violets*, *Lettice*, *Sorrel*, *Barley*, the greater cold Seeds, the juyce of Citron, of Pomegranates, and such like. And if the blood be more than ordinarily hot and thin, we ought also then to add those things that have in them an astringent quality; and such are Roses, Purslane, Plantane, and the like. But here notwithstanding we ought carefully to look to it, lest that the Veins being narrow and overstreightned, or there being obstructions in the Bowels, by the use of these or such like astringents more obstructions should be bred or increased.

And then again, we ought not only to administer contrary Medicaments for the altering of the blood; but likewise to remove from the Patient, and cause him to omit and forbear the use of such things as either introduce or augment those qualities whose absence we now require, as being better than their company. For instance, a hot Air is to be shun'd, surfeits with over-eating and drinking must be avoided, and Wine forborn; or if any be drank, it must be that which is weak and wel diluted; all kind of violent motion is to be omitted, and rest rather to be indulged; Wrath and venereal Embracements ought likewise here carefully to be avoided and abstained from.

Revulsion or drawing back. Revulsion or drawing back ought moreover to be ordained, and the humor is to be turn'd away unto a contrary place, that is, we must so order it, that a contrary motion may be procured unto the humor, and that it may move unto that part unto which it naturally tends; so that it may not flow unto the part affected. For, that the turning away and drawing of an humor flowing into some part unto that which is contrary may be termed Revulsion, we rightly take it for granted, and by *Hippocrates* at the first appointed and ordained. For (as *Galen* informs us in his fifth Book of the method of Physick, Chap. 3.) this was the invention of *Hippocrates*, that a Revulsion should be made un-

The controversie in Revulsion.

to the contrary or opposite places. Now although it be much controverted by Physitians, what is here to be understood by this word Contrary; yet notwithstanding we judg the Opinion of *Galen* to be very plain and perspicuous, if we well examine together what he hath here and there oftentimes written upon this subject; and if we take a right view of the conditions that are requisite in a Revulsion. But that *Galen* by the word [Contrary] understood nothing else but the parts contrary, that is, far distant and remote from the part affected, is every where manifested in his own writings: for thus he argueth in his fourth of the meth. of Physick Chap. 6. If it be a perpetual standing rule (as we have learn'd from him, viz. from *Hippocrates*) that a fluxion if but beginning is to be drawn to the contraries, but if already fixed in the aggrieved particle, it is then to be evacuated, either from the particle it self which is afflicted, or else from that which is next neighboring unto it; we may now hence readily conclude, as to the point of this blood-letting, that at first (*i.e.* in the beginning of the distemper) it ought to be attempted from a far off, but afterwards from the affected parts themselves. Now what kind of remoteness, and what sort of longitude he understands, is explained in his fifth of the Method of Physick, Chap. 3. A Revulsion (saith he) ought alwaies to be carried downward in those affects which are upward; and upward evermore in those that are below: and moreover also the Revulsion ought to be made from the right side unto those on the left; and again in like manner, from those unto these: and semblably, from those places that are internal unto such as are outwardly scituate; and on the contrary, from these unto those. For when as the main scope of Revulsion is, not to evacuate those humors which are already conteined in the part affected, but those rather that are flowing thereunto; and seeing it respects rather the part sending the blood, than that which receives it: from these premises it necessarily follows, that questionless this is required in every revulsion, to wit, that it should by all means procure a motion contrary unto that which flows, that so it may not any longer be moved unto the part affected; and for this cause, the revulsion must not be ordain'd either from the grieved part, or from that next unto it; but rather from the opposite, yea (and so far forth as possible it may be) from the places most remote from the affected part. And hence also it is that every opposition doth not constitute a contrariety, neither hath every kind of opposition any place in a Revulsion; but those oppositions alone which *Galen* (in the before alleadged third Chapter of the fifth Book of his Method of Physick) recites; to wit, upward and downward, from the right side parts unto the left, from the places that are within unto those that are external, and so on the contrary. Yet if there be only but a very smal inconsiderable distance, we cannot safely not conveniently draw back from the parts more inward to those more externally scituate, but then only when the distance is greater. But that opposition which is from before and behind, or according to the fore parts and hinder parts, hath no place in this kind of Revulsion, which is so called singly and absolutely. For neither if any affect shal chance to be in the backward part of the Head, are the Forehead Veins forthwith to be opened, by way of revulsion, since that may not be done (without manifest danger) during the continuance of the Plethory, and flowing of the humors. But enough hath been said of Revulsion in the fifth Book of Institutions, Part 2. Sect. 1. Chap. 18.

Revulsion twofold:

But that we may in few words contract whatsoever hath there more at large been spoken, and whatever else may be said upon this subject; it is in the first place to be taken notice of, that Revulsion is twofold, one, which is accomplished together with the evacuation of the humor, such as is that which is effected by Blood-letting, and Cupping-Glasses with Scarification; the other which is wrought without the evacuation of the humor, such as is that which is performed by Fractions or Rubbings, Ligatures, and Cupping-Glasses without Scarification. This latter is never to be practised, but when the Revulsion is to be made unto the parts most remote, since that if it be instituted in the neer adjacent parts, then the humor which is only stirred, and not totally evacuated, may without any difficulty or resistance rush upon the affected part. And it is very rare, and scarcely ever known, that this kind of revulsion hath place or any thing to do in an Inflammation, which requires a manifest, sensible, and suddain evacuation of the blood.

Revulsion by opening of a Vein:

Furthermore, as for what concerns Revulsion which is effected by opening a Vein, this one thing at least is to be observed (which if it be well heeded, many intricate controversies touching the thing now in question may be determined) to wit, that the utmost endeavor must be used that a contrary motion may be procured unto the blood, and that (as much as possibly may be) drawn back unto that Fountain from whence it flows. And since that the Liver is the Fountain and Sourse of the blood, and that the greatest store of the blood is conteined in the *Vena Cava* or great hollow Vein nigh about the Liver, we must do our utmost, that the blood which flows into the inflamed part may be drawn back towards its Spring-head; yea also if it be possible, unto the opposite part, yet notwithstanding so, that the blood which flows may be retracted and drawn back. And therfore in every Revulsion this at least is to be wrought, that the blood may obtain such a motion, as that by it the part affected may not be injured

injured by its immoderate conflux, but that it may rather be again recalled from the diseased part. But how this may be effected in every part, here to declare unto you would be a business too tedious; besides, we have already elsewhere spoken to this very point, in our treating of particular affects.

Revulsion when to be ordained, & after what manner.

And by what hath been said (as I conjecture) it is sufficiently apparent, how and in what manner a revulsion is to be ordained in case of an Inflammation; so that there wil not be any great need, that we should add much as touching the right and due administration thereof. For whereas revulsion is then only suitable and proper unto the Humors when they flow, and unto them alone, and not unto those which have done flowing, and have seated themselves in the part affected; it is hence manifest, that it ought to be instituted and appointed in the very first rise of the distemper. Notwithstanding this is not so to be understood, as if in the first appearing of an Inflammation we were instantly to put revulsion in practice; for if either there be no great store of blood, or if its rushing in upon the part be not over violent and impetuous, Medicaments that drive back and derive will be sufficient. But then only is Revulsion to be put in practice, when there is great plenty of blood, and a more than usual violent and forcible rushing thereof unto the part affected: and according to the greater or less proportion of this abundant blood, and the more or less vehemency of its motion, so answerably ought the Remedies and Medicaments that are prescribed for Revulsories or drawers back, to be ordained so much the more or less strong and forcible. But now that Revulsion which is made with an effusion or emptying forth of the matter must needs be greater than that which is made without it. But amongst all the Remedies which we term Revulsories or drawers back, the most prevalent and efficacious, is, the opening of a Vein; which said Venesection doth more effectually, or less strongly draw back, accordingly as the Veins that are opened be greater or less. The greater Veins are to be opened whiles the blood flows with greater violence, and (as we may say) with a more impetuous motion; and the lesser, when the Fluxion of the blood is less forcible and impetuous. For it is behoveful that the Remedies should be such as may by their celerity or swiftness contend with the over hasty motion of the matter. And therefore we acknowledg *Fernelius* to be in the right, in his second Book of the Method of Physick, Chap. 7. where he writes, That the opening of the Shoulder Vein in the Elbow doth very conveniently draw back al the affects of the Head, as wel internal as external, arising from fulness; if they be on the right side, the right Vein; but if on the left side, the left Shoulder Vein is in the Elbow to be opened. But if this be to be done more deliberately and slowly, as to instance, when the intention and main drift is only to anticipate and prevent future Diseases, then that Vein in the Hand which runs directly unto the Thumb and fore Finger is to be opened, unless haply it take its original from elsewhere, and not from the Shoulder Vein. But for those distempers which are seated betwixt the Channel bone and the Kidneys, the more inward Vein in the Elbow being opened doth more speedily and with greater force draw back from them; but more slowly and dully that Vein in the branch of the Hand, which is extended and stretched forth between the Ring-finger, and the little finger.

Repulsion or driving back.

Repulsion or driving back is used to follow revulsion. For Repulsion and Revulsion as it were mutually assist each other; and hence it is that both these Remedies are to be administred in great Inflammations; yet notwithstanding Revulsion ought alwaies to have the precedence. For Repelling Remedies that drive back may not safely be administred while the body continues full, since that the Vessels yet remaining ful wil hardly give way unto the Humor that is driven back; but if Revulsion be first made use of, where there is occasion for it, afterwards those things that drive back may with more safety be administred. For Repellers both drive back the flowing humor unto some other part, and so permit not the passage thereof into the distempered part; and they also likewise repress the humor which is newly flown into it, and which sticks in the Capillary Vessels; and so by this means they free the part affected from that overgreat abundance of blood. But albeit the benefit arising from these Repelling Remedies be very great and evident, as that whereby the fluxions even in their beginning (by the alone use of these Repellers) are stopped, and the part which began to be lift up into a Tumor again fals down from its Swelling; yet notwithstanding these ought not evermore in al cases to be administred. For (that we may not again repeat what we said before, to wit, that driving back benefits nothing in a full and foul body, but that likewise it cannot then be so much as attempted without danger) it is altogether improper and unfit to administer those things that drive back, when a far greater discommodity and inconvenience may be feared from the repulsion or driving back of the blood, than from the Inflammation it self; which may very wel be, first, if the humor be malignant, venemous, and pestilent; the which if Nature shal thrust forth from the inward parts unto the outward, we ought not to drive it back again unto the internal parts, lest that it should (peradventure) make its retreat back unto those inward parts, and thereby encrease the disease, and indanger the

When Remedies that drive back are not to be made use of.

choaking

choaking of the man. Which very Caution is likewise to be observed in every other humor (be it what it wil) that Nature (rightly acting in a critical way) rejects and casts forth into any some one part. For Nature while it is rightly imployed and busied is by no means to be impeded in her operation. Secondly, Those things that drive back are not safely to be administred in the parts which we term ignoble, or less considerable, being such as Nature hath ordained to receive the superfluities of the more noble Parts; unto which she is oftentimes wont to thrust out the Humors with which the more noble parts are burdened and even loaded; and such are the *Glandules* or Kernels in the Groins, Arm-pits, and behind the Ears. For if repelling Medicaments be applied unto these parts, there will be great cause to fear, lest the matter should again retire to the more noble and principal parts. Furthermore, thirdly, There are other places, and other parts likewise, unto the which Repellers may not commodiously be applied; and such are al those that in their scituation too neerly neighbor upon the noble parts: For the very same thing (as before said) is to be feared, lest that the matter being driven back should invade some of the nobler parts, and create a greater mischief. In the fourth and last place, Repelling Remedies are not then to be tampered with, when the parts are scituated in a place too profound, or over deep. For neither doth the vertue (as we cal it) and strength of the Repelling Medicaments reach unto such parts; neither can it wel be prevented, but that those parts are hereby rather made more ful, than any waies emptied. For while by Repelling Remedies the exterior parts are contracted, and from out of them the Humors are driven inwards, they are (after a sort) thrust and obtruded upon the affected part, the which by this means becomes more repleniſhed.

The time when Remedies that drive back are to be administred.

But then again, For the time and season when these Repellers are to be administred, it is easily discernable. To wit, seeing that the main end and scope of driving back is this, That the flowing humor should be prohibited its passage, and rejected, therefore they are to be prescribed in the very beginning, and that most rightly and properly whilest the matter is yet flowing. But this notwithstanding ought evermore carefully to be observed, as we said before, that the body be not ful. For if the body yet remain ful, drivers back are not safely administred, whenas the blood hath not any free passage for its retreat, and so by this means becomes either more impacted into the part, or else rusheth into some more noble part, and so create a greater danger. But when indeed (even whilest it is in its augmentation) there is yet some of the blood in flowing, even then repelling Medicaments may be administred, yet not alone; whereupon we judg it not amiss, that unto these we add and mingle therewithal some kind of Digestives, to the end that by the heat somwhat may together also be attenuated, and converted into exhalations.

How Medicaments that drive back are to be mingled with those that digest.

Now after what manner Repellers are to be mingled with Digestives, *Galen* instructs us in his sixth Book of the composition of Topical Medicaments, that is, Medicaments that are made suitable unto the part affected, Chap. 1. Like as (saith he) in the beginning those Medicaments that drive back that which flows in are useful and commodious; so, after the beginning, even unto the very end, those Remedies that consist of both together wil be requisite, to wit, such as have in them both a repelling faculty to drive back, and likewise a digestive faculty to discuss and scatter: and as for the time, the astringent Remedy that drives back ought to have the precedence, and in the end that which digests and dissipates; and in the time intervening betwixt the beginning and the end, the Remedies ought to consist of equal parts of both the sorts before specified. But whereas *Galen* elswhere seems to be of a somwhat differing judgment, so that it may be doubted whether Digestives also are to be mingled in the very beginning, or that we are only to make use of Repellers; and whether or not in the state or perfection only digestives are to be applied, or otherwise whether that Repellers may not likewise be added and mingled therewith, these things thus controverted ought rightly to be understood; and thus indeed it may be done. For whereas each part of the times of an Inflammation may again also be divided as it were into three times or spaces, the end of the preceding participates the nature of the beginning that followeth, and almost agreeth with it: hereupon even almost in the first beginning of an Inflammation, or that part of the beginning which is yet further distant from the augmentation, Repellers only ought to be put in practice. But the beginning tending toward the augmentation, or in that very part of the beginning which having already made a good progress is now nigh unto the augmentation, it will be requisite and convenient therewith to mingle Digestives. In the augmentation, and the beginning of the state or perfection Digestives and Repellers are almost equally to be mingled together. For although the blood doth now no longer flow; yet notwithstanding, since it is not so altogether impacted, some part thereof may as yet be driven back. But then afterward in the midst of the state Digestives ought to take place, as most prevalent; and in the end of the state or perfection of the distemper the remedies alone are to be administred; and the same is also to be observed and accordingly practised when the Inflammation is now at length in its declining condition.

Furthermore,

The quality of Medicaments that repell or drive back.

Furthermore, that in our Discourse we may make our approach, and come closely to speak of the subject Medicamental matter it self, all repelling Remedies are cold; as *Galen* asserts in his fifth Book touching the making of simple Medicaments, Chap. 17. For like as heat attracts and draws, so that (whatever it be) that is cold repels or drives back from it self. But then, look as whatever is hot is not in or of it self the principle of the local motion, or attraction, but only as we use to say, *per accidens*, or accidentally; to wit, as it resolves into vapors the matter that is moist, in the room and place whereof (lest a vacuity should happen and follow thereupon, which Nature evermore abhors, and wil by no means admit of) those things that are neer neighboring do afterward succeed: so in like manner, that which is cold doth not of it self drive back, but accidentally, to wit, as it causeth a constriction; by which motion of constriction the thicker parts do coalesce and seat themselves close together, but the thinner are pressed forth. But then that coldness hath adjoyned with it sometimes humidity or moistness, and sometimes its contrary, siccity or drineſs. And hence it is,

Repellers twofold

that of such Remedies as drive back there are two sorts or kinds: one moist and cold, or wateriſh; the other cold and dry, or earthy; and as *Galen* tels us in the Book next before alleadged, it hath conjoyned with it a thickness of the parts. Such as are of the latter sort, since that besides their coldness they have likewise an astringent power, they therefore with a double force, as by their coldness, so also by their astringent faculty, do the more strongly and vigorously repel and drive back. But then those cold and moist Repellers are more mild and gentle, which therefore have power only to drive back the thin humors that are seated in the superficies, and then also when there is no great store of them; and they are commodiously administred when heat and pain afflicts the part. For they do not only oppose and resist the influx of the humors, but they also allay the heat, and by relaxation do something mitigate and asswage the pain. But Repellers with astriction are proper in other cases; and chiefly if the fluxion proceed from the debility of the parts, and that the pain be not over urgent. For they strengthen the part receiving, that so it may not receive the humor flowing into it, and they drive back that which hath already flown in. And they profit likewise, if the Vessels through which the blood floweth be wide and large, like as when the Vessels are smal and streight the gentler sort of Repellers are sufficient. Of the former kind are, Housleek, Wall-Penywort, Lettice, Purslane, Endive, Nightshade, the juyce of Gourds, Water Lentils, Fleawort, Water-lilly, Arrach, Violets, and al other Medicaments that are cold, and which are indued with a Watry humor. Notwithstanding even among these themselves there are also certain degrees; and some of them have a greater, some a less efficacy. Wall-Pennywort and Fleawort drive back less forcibly than Lettice, Housleek, Purslane, and Nightshade.

Repellers with astriction are, the flowers and heads of Roses, the Leaves of the Bramble bush, Vine Leaves, Saunders, Medlers, the fruit of the Service Tree, Wild Pears, Quinces, the Leaves and Fruit of the Myrtle Tree, Pomegranate flowers, Frankincense, the Rinds of Pomegranates, Acacia, Bole Armenick, Earth of Lemnos (called *Terra sigillata* or sealed Earth) Dragons blood, the Leaves and Nuts of the Cypress Tree, Oak Leaves, unripe Galls, Cerus, Litharge, Corals.

Out of these there are compounded divers Medicaments (which you shal anon find expressed) according to the diversity of the disease it self, and its circumstances. For of the Plants, either the crude raw Leaves themselves are imposed upon the grieved part; or otherwise if by reason of their roughness this shal not be deemed convenient then let them be boyled in water, in the which let linen cloaths be dipt, or else spunges throughly soaked, and so let them be laid upon the part affected. Or else the juyce is pressed forth, and applied in the same manner. But others of them are bruised, and then mingled with Liquors are applied in a different manner. *Galen* was wont to dip a spunge and wet it wel in an Oxycrate, that is, a compound of Vinegar mingled with some other Liquor, and then to apply it unto the part. To the same end and purpose are convenient the Oyl of Roses and Myrtles, the Unguent of Roses, the cooling Santaline Cerecloath prescribed by *Galen*. And this likewise that followeth is an excellent Remedy, and in frequent use with Chirurgeons, viz.

Take *the Whites of Eggs, and Rose water, of each alike; let these be well shaken, and throughly mingled together; then let Linen Clouts be wel wet and soaked therein, and so laid upon the part.*

Or, Take *Barley Meal, which boyl in Vinegar and the juyce of Plantane, and lay it upon the grieved part.* *Galen* in his second Book to *Glauco*, Chap. 2. commends a Cataplasm of Housleek, Pomegranate Rinds boyled with Wine, and so made up with Sumach and Barley Meal. For this Cataplasm (as saith *Galen*) is absolutely the best in such like affects; and also very effectual to al those purposes we intend it for. For it drives back that which flows in, dries up what is therein contained, and fortifies the Members scituate round about. Or it may be thus compounded:

Take *Housleek three ounces; Barley Meal two ounces; Pomegranate Rinds one ounce; Sumach ten drams: bruise what is to be bruised, and then boyl them all together in Wine for a Cataplasm.* *Galen* likewise made use of the Plaister

fter *Diachalciteos*, diſſolved with the Oyl of Roſes, or Myrtle. This likewiſe is profitable.

Take *Plantane, Roſes, Lettice, Purſlane, of each alike, one good handful; boyl them in Water, unto which put a little Vinegar to mingle therewith, and then add Barley meal.* Or,

Take *the juyce of Houſleek, Plantane, and Roſes, of each one ounce and half, Barley meal one ounce, Vinegar, half an ounce, Oyl of Roſes as much as will ſuffice; boyl them into the form of a Pultiſe.* Or,

Take *Pomegranate rinds, red Saunders, of each half an ounce, Bolearmoniack two ounces, Barley meal one ounce, Houſleek one ounce and half, Oyl of Roſes and Myrtle of each as much as is ſufficient; and make a Cataplaſm.*

Where there is need of a ſtronger Repulſion, and if the part wil admit of it, thoſe Remedies that are ſomewhat more forcible are to be uſed. As,

Take *Bolearmoniack, Dragonsblood, of each one dram; the Root of the greater Comfrey half an ounce, Barley meal two ounces, make a powder; which as occaſion ſhall require is with Roſewater and the white of an Eg made into the form of a Cataplaſm, and ſo laid on.*

Intercepters and Defenſives:

Thoſe things that Intercept (which are alſo commonly called Defenſives) are the ſame with Repellers, and only differ in reſpect of the place whereunto they are applied. For drivers back are applied unto the very place inflamed, but Intercepters and Defenſives unto the parts and waies by which the humor flows unto the affected part, that ſo it may be intercepted in its paſſage, and that the way may be ſhut up againſt it, that ſo it reach not unto the aggrieved part. And indeed theſe are moſt commodiouſly applied to thoſe parts that have little or no Fleſh, and unto thoſe in which the Veſſels do more appear and are conſpicuous, as in the joynts, and above the joynts. As for inſtance, if the inflammation be in the Hand, they are then applied unto the Wriſt; if betwixt the Wriſt and the Elbow, they are then to be applied above the Elbow; if in the Shoulder, to the higheſt part thereof; if in the Foot, above the Ankle-bone; if in the Leg, above the Knee.

Their Quality:

Now all Intercepters are cold, dry, &of an aſtringent or binding faculty: among which notwithſtanding ſince there is no ſmal difference, as erewhile was ſaid of Repellers, we ought to uſe the gentler ſort of them in the more tender bodies, where the fluxion is not great, the Veins ſmaller, and in the Winter time. But thoſe of them that are more forcible are to be made uſe of in ſtronger Bodies, where the fluxion is greater, the Veſſels wider, and in the Summer time. But Medicaments that intercept are to be adminiſtred after a different manner. For either the juyces, as of Quinces, Pomegranates, Plantane, Houſleek, the Bramble or Blackberry buſh; or elſe the decoction of Saunders, Pomegranate Flowers, Myrtles, Sumach, Roſes, or Roſewater, Plantane, Houſleek, or Vinegar and Oxycrates are uſed, and linen Cloaths are wel moiſtened in them, and then applied to the Joynts and the parts betwixt; or elſe, laſtly, aſtringents being pulverized and mingled with proper liquid Remedies are to be adminiſtred.

The Vulgar or common Defenſive is made after this manner, *viz.*

Take *Bolearmoniack, Dragons Blood, Lemnian or ſealed Earth, all the Saunders, of each one ounce; Oyl of Roſes and Myrtle, of each a ſufficient quantity, of Wax a ſmal quantity, Vinegar of Roſes one ounce, mingle them, and boyl them till the Vinegar be all conſumed.* Yet notwithſtandig the Oyls and Wax are deſervedly and not without cauſe to be ſuſpected in theſe preſcriptions. For by their fat unctuous or oyly ſubſtance they molliſie the parts, and they likewiſe overheat them if they long ſtick upon them. And therefore it wil be more ſafe to apply the aforeſaid or ſuch like powders mingled only with Roſe water or Oxycrate; and if we would have them to be ſomwhat more forcibly aſtringent, mingled with the white of an Egg well beaten and ſhaken together. For by this means they ſtick and cleave the more tenaciouſly unto the part, and cauſe a conſtriction thereof. As,

Take *Bolearmoniack, Dragons Blood, of each an ounce, Flowers of red Roſes, Pomegranate flowers, Myrtles, red Saunders, Pomegranate rindes, of each an ounce; make a Powder hereof, which afterward mingle with the white of an Egg and Roſe water, or Vinegar, as much as wil ſuffice.*

Derivation.

And laſt of all, we may alſo in this place make uſe of derivation, which hath reſpect unto the blood that hath indeed already flown in, yet notwithſtanding as yet is only poured forth without the Veins into the void ſpaces of the part, but as yet fluctuats or flows to and again in the Veins. Neither indeed can the blood poſſibly be derived which is already impacted in the part, or that already begins to be concocted, or to be turned into *Pus*, or quittery matter; ſince that it is now become more thick than formerly, and conſiſts (as having taken up its abode) in that place out of which it cannot eaſily flow back, and thereupon is rendred the unfitter for motion, and the more earneſtly and greedily retained by Nature until it be there digeſted and concocted. From whence wil eaſily appear, at what time the derivation ought to be ordained and adminiſtred, to wit, indeed in the very beginning of the Inflammation; and yet notwithſtanding not inſtanly upon the very

first

firſt onſet of the Diſeaſe, but toward the augmentation thereof, when its beginning is now at hand, to wit, when by means of Revulſion and Evacuation already both preſcribed and adminiſtred the blood is rendered not over abundant, and that which is doth not as yet pertinaciouſly and fixedly adhere unto, or ſtick in the parts, but as yet continues to be fluxile and apt to flow. Wherefore, that we may rightly underſtand that which is on all hands taken from granted, to wit, that during the conſiſtency or continuance of the Inflammation derivation ought to be adminiſtred, this is not to be taken as meant either of the ſtate or (as we cal it) the perfection of the diſtemper, or of its declination, but rather of the latter part of its beginning.

In derivation what to be obſerved.

Now in Derivation, that community and correſpondence that is between the Veins and the part affected (of which we have formerly made mention) is eſpecially to be obſerved. For if the blood that is in the Veins of the affected part ought to be drawn thence unto the neighboring parts by derivation, then in this caſe we muſt evermore make choyce of ſuch a Vein to effect it by as hath the neereſt commerce and vicinity with the part affected; the which if it be opened, brings along with it an apparent and admirable benefit. But now for the meaſure and proportion that we ought ſo heedfully to take notice of & obſerve in letting blood by way of Derivation, *Hippocrates* informs us, in Book 7. of the Courſe of Diet in acute Diſeaſes, chap. 10. The blood (ſaith he) muſt be drawn away ſo far forth, and ſo long, until it flow forth more red, and much yellower, or that inſtead of a ruddy color it appear to be of a livid, or leaden-like color. For (as *Galen* there tels us) whatſoever blood is contained in a *Phlegmone*, that ſame will be changed in its color through the abundance of heat, but the reſt will all of it continue alike in all parts of the body. And for this cauſe, that blood which is contained in that ſide that is afflicted and inflamed with a *Phlegmone* muſt needs be much more red and ruddy than that which is diſperſed and diffuſed throughout the whol body; eſpecially if the body be pituitous or Phlegmy. Now if the blood that is diffuſed into the whol body appear to be al of it of a more ruddy color than ordinary, without doubt then that which accompanieth the *Phlegmone*, boyled and burnt as it is, muſt needs be changed into a black hiew. And from hence it is, that a change in the color denotes and ſignifies a tranſlation of the blood from out of the part affected; which ſaid change notwithſtanding is not evermore to be expected, if ſtrength be wanting in the Patient.

And after ſuch like waies as theſe may the Humors that flowing forth together unto a part generate there a Phlegmone be removed from the aggrieved part. Among the which before mentioned notwithſtanding, thoſe Medicaments that drive back and derive very much, conduce (like as the other) for the removal of the humor that flows amain into the part affected. For Repellers, although their principal ſcope be to repreſs the humor that flows in and is as yet contained within the Veins of the part; yet notwithſtanding they have a power alſo to drive, and thruſt back again into the Veins, & to caſt out of the part thoſe humors likewiſe that are newly fallen forth without thoſe Veins, and as yet not irremovably fixed in the place whither they are fallen. For neither is it a thing impoſſible that the Humors that are fallen out of the Veins ſhould again retire back into them; even as many ſorts of Tumors in the skin evidence unto us the truth hereof, which now and then in a cold ſeaſon ſuddenly vaniſh away, and diſappear. And ſo likewiſe derivation, albeit it hardly cal back thoſe Humors that are fallen forth without the Veins; yet notwithſtanding, as for the blood which fluctuates in the Veins of the inflamed part, it hath a power ſufficient to draw it unto the neighboring parts, and by them to evacuate it.

Evacuation.

Notwithſtanding, ſince that by the alone uſe of Repellers and Derivers al the whol matter is ſeldom evacuated out of the part inflamed, but that after the uſe of them for the moſt part ſomwhat is left remaining behind, this ought in another manner and by other means to be evacuated. Now this evacuation is accompliſhed after a twofold manner; either inſenſibly and by an imperciptible tranſpiration (which the Grecians cal *adelos diapnoe*) or elſe ſenſibly and manifeſtly: The matter is evacuated inſenſibly by Diaphoreticks or Sweaters, as likewiſe by thoſe that we term Digeſtive, Diſcuſſive, and reſolving Medicaments. The ſenſible evacuation is performed by ſcarification, and the opening of the part, after ſuppuration, or (as we commonly term it) maturation of the peccant humor. We will therefore in the firſt place treat of the former manner of evacuation, and declare our opinion touching diſcuſſive Remedies.

Diſcuſſion

But now, ſince that reſolution or diſcuſſion is nothing elſe but an evacuation of the humor by an inſenſible tranſpiration, it wil from hence eaſily be made to appear, that what is to be diſcuſſed ought to be thin or fluxile, and not over clammy and thick; neither the ſkin it ſelf too much ſhut up and condenſed. For if the matter be over thick, it cannot then be eaſily reſolved into vapors: but if the skin be too thick and compact; like as alſo if the matter ſtick in a place over deep; when all or any of theſe happen, then the matter cauſing the diſtemper finds not eaſily any way for its paſſage forth, neither can any Remedies but what are very forcible penetrate unto the place affected.

Discussives, what they are for their quality

Moreover, since that al digestive Medicaments ate hot in their operation (as by and by we shal further shew you) they are therefore to be administred not over haftily in the very beginning of the Inflammation; but then we ought rather to make use of Repellers, for the reasons before mentioned. But the Inflammation approaching now nigh unto (or if ye will, while it is yet in its passage towards) its augmentation, some kind of digesting Medicaments ought to be mingled with the Repellers: and so al along the quantity of the Discussives ought evermore to be encreased, until at length in the declination they alone come to be administred. Now the truth is, al Digestives or Diaphoreticks are hot; for the Humor cannot be resolved, attenuated, and converted into vapors, but only by heat. But of such things as are hot there is a very great difference: for some of them do only rarefie, or open the orifices of the Vessels; other of them cut the Humors; and a third sort there is that attracts and draws them; and last of all, there are others that are of a burning quality. Now the Diaphoretick Medicaments differ from them all; and have in them this proper and peculiar faculty, to resolve the Humors, and to convert them into vapors. Which said quality of theirs may not so easily be described by their Causes; but it is rather discovered by the experience that we have of their effects: so that what cannot be defined by reason, that same is supplied by experience, and use. But now although al Diaphoretick Medicaments are in their own Nature hot, and that they acquire this faculty from a certain due proportion observed in their mixture; yet notwithstanding, among them, some are stronger, some weaker. Those of the milder sort are, Chamomel, Melilot, the Roots of Marsh-mallows, the Roots of white Lillies, and of Fenugreek, the flour or meal of Lupines, of Orobus or bitter Vetch, and of Cicers or Chiches; leavened Bread, Goose fat, old Oyl. The stronger of them are, Dill, Organy, Thyme, Pennyroyal, Hyssop, Calamint, Horehound, Orace roots, Rue, Sage, Annis seed, Fennel seed, Caraway seed, flowers of the Elder Tree, Ammoniack, Bdellium, Galbanum, Buls fat, Bears grease, Oyl of Rue and Laurel. And those most of al forcible, are, Nitre, and the froth thereof, Sulphur or Brimstone, Lime, and the like.

We make use of the milder sort, when the matter is in a place not very deep; when the part affected and the body it self is more soft and relaxed, and the Inflammation but smal and inconsiderable. But if the Inflammation be greater, and the matter scituate more deep than ordinary, the body it self more hard and condensed, in this case the stronger Medicaments are to be administred. Notwithstanding we ought to use the stronger Discussives with due caution, lest that by them the thinner parts of the Humors being discussed and resolved, and the thicker parts left remaining behind, the Tumor should be hardened, and the Malady rendered incurable; which wil most commodiously be prevented, if together with such things as forcibly discuss we likewise mingle those things that moisten and mollifie. We ought in like manner to be very cautious, that the Discussives be not over tart and biting, lest that by their biting property they the more excite pain, and augment the fluxion.

Now out of that before recited Medicamental matter, there are divers kinds and forms. In the end of the beginning of the Inflammation, and likewise in the augmentation, such like Remedies as these that follow are of singular use.

what is to be done in the encrease or augmentation of an inflammation

Take *Barley Meal two ounces; Linsed one ounce; the Pouder of Camomile flowers half an ounce; boyl them in Vinegar; then add of Oyl of Roses and Camomile, and the fat of an Hen, of each alike as much as will suffice, and make a Cataplasm.* Or otherwise:

Take *Pellitory of the wall, Mallows, Plantane, of each one good handful: boyl them in Water: with the which let there be a very smal quantity of Vinegar wel mingled together, and so let them be bruised into smal pieces: after they are thus brayed, add of Barley meal two ounces, Fenugreek seed an ounce and half: Oyl of Roses and Camomile, of each as much as will suffice, and make a Cataplasm.*

A most excellent and useful Cataplasm to prevent Inflammations in Wounds, and in other cases. Viz.

Take *the pouder of Camomile flowers, of red Roses, of Wormwood, and Barley meal, a like quantity of them al: boyl them in pure clear Water, and make a Cataplasm.* Or,

Take *the pouder of Camomile flowers, red Roses, Wormwood, Barley Meal, of each three ounces; Decoct them in common Water; then add Oyl of Roses one ounce and half, and make a Cataplasm.*

What in the state or perfection of it.

In the state or perfection, such like as these that follow may be administred.

Take *Camomile Flowers, and Melilot Flowers, the Leaves of Mallows, of each half a handful; red Roses two large handfuls, boyl them in austere or sharp Wine, and then add of Fenugreek meal one ounce; Oyl of Camomile a sufficient quantity, and make thereof a Cataplasm.* Or,

Take *the Roots of white Lillies one ounce; the flowers of Camomile and Melilot, of each one good handful: red Roses and the tops of Dill, of each half a handful: boyl them in simple common Water, and let them be bruised very smal: then*

then let there be added, of the Meal of Millet seed, Fenugreek Meal, and Barley Meal, of each an ounce; Saffron half a dram; Oyl of Camomil as much as will suffice, and make a Cataplasm. Or,

Take *the Pith of wheaten Bread six ounces; boyl it in common Water, and after this let it be strewed with the Pouder of Camomile flowers and Melilot flowers, of each half an ounce, red Roses two drams, Saffron half a dram, and so make a Cataplasm.*

And what in its declination.

Lastly, In the declination, such like Remedies are to be put in practice, Viz.

Take *Marsh-mallow Root one ounce: the leaves of Mallows, Organy, the flowers of Camomil and Melilot, of each half an handful: Lin-seed, Fenugreek seed, and Dill seed, of each alike two drams: Decoct them in a sufficient quantity of Water, and make a fomentation to be applied warm with a Spunge.* Or,

Take *the Pouder of Camomil Flowers, of Elder and Melilot flowers, of each of these half an ounce; Dill seed two drams, the Meal of Lin-seed, Fenugreek, and Beans, of each one ounce; Oyl of Dill and Camomile, of each alike as much as will suffice; and make a Cataplasm.*

This (moreover) as touching Digestives is to be taken notice of; to wit, That if the matter be grosser and thicker than ordinary, insomuch that Digestives cannot satisfie the expectation by doing their office, we must then do our endeavor that the matter may be rendered fit for Discussion and transpiration by sweat; and this may conveniently and securely be done by mollifying Remedies. And therefore in such a case (as before we likewise hinted unto you) we ought not only to abstain from those Medicaments that over-heat and dry; since that they discuss, waste, and consume the humidity that is in the Tumor, and harden the matter, and so cause the Malady to become altogether incurable: but we ought likewise to administer mollifying and loosening Remedies, such as do moderately heat, and withal do not excessively dry, but rather moisten; which kind of Medicaments you may before find enumerated and reckoned up among the Digestives themselves; such as is Hens fat, Goose fat, the Roots of Marsh-mallows and white Lillies, Mallows, Lin-seed, Fenugreek, Bdellium, Ammoniacum, and such like; al which are most fitly and conveniently administred when the matter is thicker than usual, as we shal further shew you in its proper place, when we come to speak of Emollients or Mollifiers. And in this manner the matter contained in an Inflammation is to be removed by insensible transpiration.

But we have acquainted you that this matter is sensibly and perspicuously poured forth either by scarification, or by opening of the part, after that the *Pus* or purulent matter is generated. As for what concerneth Scarification, that it ought to be administred, *Galen* gives us his judgment clearly for it, whilst that in his ninety fifth Chapter of the Method of Physick he thus writes: But thou shalt more especially evacuate (saith he) both by the useful assistance of scarification, and by the help of Medicaments that have in them a power and faculty to dissolve, in case thou observe any thing to be contained in the intervening middle spaces. And in his second Chapter of a Tumor he thus writes: It is (saith he) by Physicians found to be expedient, in the case aforesaid, not only to discuss by the means of heaters, but likewise sensibly to evacuate at least some part or portion of the blood it self, by making scarifications in the Skin. But here then we are to know, that great heed and circumspection ought to be taken and had, whether or no the matter may be turned into *Pus*, as we term it, being the snotty fetid matter ensuing upon maturation. For if we may probably hope for the said suppuration, then the above mentioned scarifications have not any the least place. But then on the other hand, if the matter may not be changed into the said *Pus* or matter, and that notwithstanding likewise there be little or no hope that possibly it may be wholly discussed or scattered by the application of Medicaments, then in this case both Scarifications and Cupping-glasses may, nay ought to be administred. For these two are a very effectual and prevalent Remedy for the evacuation of the matter (whatever it be) that sticks and is deeply scituated, and which seemeth forthwith to be in the ready way of conversion into a *Scirrhus*. And therfore they are by no means to be administred in the beginning or first appearance of the Inflammation, but at length after that the body is sufficiently emptied, and that the *Phlegmone* is at a stay; that so there may be further cause to feat that a new fluxion should be excited by that pain which originally proceeds from scarification; and then only when we have a purpose to extract that which remains over and above after the use of other convenient Remedies. Yet notwithstanding Scarification hath place only in those parts which in other cases likewise are fit to undergo and suffer the said Scarification. For if an Inflammation happen unto any part unto the which in any other case scarification ought not to be administred, I conceive that there wil be found no man so rash and unadvised, as that he dare be so adventurous as after a *Phlegmone* (for the evacuation of the residue of the matter) to apply Cupping-glasses and administer scarifications unto the part affected. But very rare it is that scarifications are admitted and allowed of for the use and purpose aforesaid.

But the safest and most usual way of curing an Inflammation, is, that the matter which hath flown in unto the part be discussed by the Medicaments before propounded. But if thereby it may

Suppuration

not be effected, we must then have recourse unto some other means for the curing of the *Phlegmone*, and that is by Suppuration.

Now all this that hath been said must be understood as spoken of a pure and simple *Phlegmone*. But if the Inflammation be not pure, but that it rather decline unto the nature of an *Erysipelas*, or an *Oedema*, or a *Scirrhus*, then those Medicaments that are proper and convenient for these and such like Tumors are to be intermingled with the other; yet evermore with this Proviso, that such of them as relate unto the *Phlegmone* be alwaies predominant.

The Cure of an Inflammation degenerating into an Impostume.

The generation of an Impostume.

If therefore there be no hope that the Inflammation may be compleatly cured by the helps and means hitherto propounded (which will appear from the more intense signs of the Inflammation, to wit, grievous pain that encreases day after day, a manifest Pulsation or beating, and an evident discernable extension or stretching out of the part) then we ought instantly to use our utmost endeavor, that the matter that is the cause of the Inflammation may with all possible speed be concocted and brought unto suppuration, that is, converted into *Pus*. For neither can the matter yet unconcocted, and as yet not turn'd into matter, be in a due manner evacuated; and then again, if any one open the inflamed part before the said *Pus* be compleated, he shal thence draw forth nothing; and shal encrease and add unto the Malady rather than relieve and cure it. But if that same part shal be opened, the purulent matter being already elaborated and thereby brought to a due perfection, then all whatever is superfluous in the inflamed part may most commodiously be evacuated. And therefore we conclude, that the matter is first of al to be concocted, and so far forth as possible may be digested by the native radical heat. For although that matter which is conteined in a *Phlegmone* can never be so far forth concocted and elaborated that it may be rendred any waies useful and profitable to Nature, and in any sort fit to nourish the parts; Yet notwithstanding, since that there are therein certain qualities which are to Nature very offensive and burdensome, those may be taken away; and a certain kind of equality, and moderation of the qualities may be instituted; and a separation of the corrupt humors from those that are good and such as are meet to nourish the Body may be wrought; which said elaboration of the humor is here termed concoction and suppuration. And when that that is superfluous and corrupt in the part inflamed is separated from what is useful, good, and serviceable, and that the vitious qualities are now hereby coorrected and amended; and the very proper substance of the blood it self shal be changed into an equal whitish and smooth matter, and gathered together into its proper and peculiar place, so that now without any difficulty at all it may upon the opening of the part be evacuated; then and not til then the *Pus* is said to be now already perfectly concocted; and that same collection or gathering together of the snotty filth, termed *Pus* or matter, into some one particular place, is by the Grecians called *Apostema*, and by the Latines *Abscessus*; with us (in English) it is named an Apostem or Impostume, as hath been said before in the first Chapter. Now that concoction in mans Body is Natures work alone, the which by the help and assistance of the native heat digests the humors, takes pains with them, and as it were leads them along until it hath brought them unto that perfection which they ought to receive: which said heat if it be strong and vigorous, then we use to say, that the *Pus* or matter thereby bred is good and laudable; and it is (as we may find in the first Prognostick, Tom. 42.) white, equal, smooth, and not very stinking and noysom. But if the innate heat be weak, then it wil be quite and clean contrary unto what was in the former case. And therefore the Physitians office is, and his main care must be to cherish or preserve, and encrease the native or natural heat in the inflamed parts, that so by means of it the generating and breeding of the said *Pus* may the better succeed, and the more easily attain unto its perfection. The innate heat is conserved and augmented, if in the first place we take course to hinder the issuing forth of it, and then that in the next place we use all possible caution, that whatsoever of it is more debile or weak in the more external parts may not be dissipated by the ambient Air: and moreover, if Medicaments agreeable and suitable unto the Native heat be applied to the part affected; and hence it is that the Medicaments prescribed to facilitate the said suppuration or production of *Pus*, ought to be such as bear a resemblance unto the native heat in the parts to which they are applied. And thereupon since that our Nature is moist and hot, the Medicaments ought in like manner to be answerable, to wit, hot and moist. Furthermore, let them be such as we term *Emplastick*, that is, such as have in them a certain clammines, that so they may fil up the Pores of the Skin, and that they may prohibit and prevent the flowing forth of that heat that is so apt to evaporate. For all those remedies that are of a cleansing property, or else those Medicaments that forcibly heat (such as Cataplasms of Bean meal, Fenugreek, Chiches, Lupines, &c.) seeing that they permit the vapors to exhale and vent themselves outwardly, they may indeed in this respect be said to dry, but they little or nothing at all further Suppuration.

Take *Marshmallow roots three ounces, the*

Leaves

Leaves of common Mallows, and Bears-breech, of each one large handful; and then having boyled and maſh'd them, add thereto of Swines greaſe as much as will ſuffice; mingle and uſe them. Or,

Take *Marſhmallow roots, white Lillies, of each two ounces; Mallow Leaves, two large handfuls; ſul and fat dryed Figs, in number ten; boyl and bruiſe them ſmal, then add of Wheaten meal two ounces, Linſeed half an ounce; mingle and paſs them through a fine Hair-ſieve, and after add of Swines fat, Butter, or Oyl of white Lillies as much as is ſufficient, and make a Cataplaſm.* Or,

Take *Marſhmallow roots, Onions, white Lillies, alike of each two ounces, Wheaten meal one ounce, Linſeed ſix drams, Turpentine half an ounce, Saffron one ſcruple, Hens fat, and Oyl of Camomile, of each as much as will ſuffice, and ſo make a Cataplaſm.*

The Signs of Pus or ripe matter.

When the *Pus*, that is, the purulent matter, hath once arrived at its perfection, we muſt then do our endeavor that with all ſpeed poſſible it may be evacuated. But then firſt of all it muſt manifeſtly appear unto us, whether or no the *Pus* be already made and brought to perfection. For although in general we have already before (in Chap. 3. concerning Impoſtumes) ſpoken of this ſame ſubject; yet notwithſtanding thoſe things which are moſt proper to an Inflammation ſeem needfull here again to be repeated. Now therefore the beſt and ſureſt ſign is taken from the Touch. And firſt, if the part be perceived to be ſoft whiles that it is preſſed, and that there is therein felt (as it were) a certain kind of fluctuation; to wit, if two fingers of both hands, or the fore-finger and middle finger of one hand be applied to the Tumor, but yet ſo that they touch not one the other, but be ſome little diſtance aſunder, and that one of the fingers preſs down the Tumor, & the other not: for then a certain fluctuation and motion of the matter which is driven forth from place to place is perceived under the other finger that lies quiet. But here notwithſtanding it will not be amiſs to take this caution, leſt that we be miſtaken, and either (the maturation being compleated) deem that there is no *Pus* or matter lying underneath, or elſe, that we open the part, albeit there (indeed) be no filth, which we uſually call *Pus* or matter. For why, there appears a Fluctuation in ſome certain parts, even whiles they are ſound; ſuch as are the places about the Knees. And on the contrary, now and then the ſaid *Pus* or filthy ſnot-like matter, although (as to its maturation or ripening) it be compleated, yet it doth not evermore of it ſelf evidence the ſigns and tokens thereof. Touching which *Hippocrates* likewiſe makes mention in his ſixth Book, Aphor. 41. where he thus writes: Unto whom purulent matter exiſting and abiding in the Body doth notwithſtanding diſappear, and not diſcover it ſelf by any kind of token or ſignification, there we are to underſtand that it doth not diſcloſe it ſelf either by reaſon of its own thickneſs, or the condenſedneſs of the place. To wit, the ſaid *Pus* ever and anon lieth hid and conceal'd and doth not diſcover it ſelf, either by the reaſon of the denſity, that is, the thickneſs, and withal the hardneſs of the place affected; or elſe becauſe of the profundity, or if you will, the depth of the place where it reſides; as for inſtance, when an Impoſtume hath its reſidence, and lies hid between the Muſcles of the Belly, or of the Thigh, or of the great Joynts: like as it comes to paſs alſo in the Heel, and the ſole of the Foot, by means of the Skins extraordinary thickneſs. Or elſe it happeneth, in regard that the ſaid *Pus* it ſelf is overgroſs and thick; upon which account it neither can be driven forth unto the ſuperficies, neither doth it yeild unto the compreſſion of the fingers, and ſo conſequently fluctuate.

There are moreover other ſigns of *Pus* (when perfectly bred) diſappearing and lying hid. To wit, ſecondly, the place (in reference to its color) declineth unto a certain kind of whiteiſhneſs, when the maturation is already terminated; whereas before and until ſuch time as the filthy corrupt matter was ripened, it was of a more ruddy or reddiſh color. Thirdly, it is a ſign, and it argueth that the *Pus* of the quittor is compleatly ripened, if that both the heat and pain be remitted, and the extenſion and pulſation of the part be diminiſhed; touching which likewiſe *Hippocrates* thus writes, in his ſixth Book, Aphor. 47. The pains and Feavers happen and are alwaies more intenſe whileſt that *Pus* is in breeding, and untill it be perfectly bred, then after ſuch time as it is fully ripened, and the maturation compleated. For the concoction being once made & paſt, there is ſome certain portion of the matter and of the vapors reſolved; and the matter being converted into *Pus* is gathered together into one place: from whence it likewiſe proceeds, that the ſenſe and feeling of pain is not now any longer ſo great and intollerable as before, and alſo all the other ſymptoms ſlacken and grow remiſs. The fourth ſign is, that the Tumor ſtruts forth (as it were) into an eminent heighth and ſharp-pointedneſs. For Nature thruſteth forth the elaborated and ripened *Pus*, and confines it unto ſome one place, and according to her power expels it unto the more external parts, and that place more eſpecially by the which it may with leaſt difficulty and danger be emptied and caſt forth.

If therefore by theſe ſigns we get aſſurance that the *Pus* (as we term it) is already made, we muſt then (as hath been ſaid) do our utmoſt endeavor, that without the leaſt delay it may be evacuated. For if the ſaid *Pus* be overlong deteined it overthrows the temper of the member, corrupts the adjoyning & neer neighboring parts and ſo the Ulcer proves to be intricrae and full of

turnings

turnings, or else degenerates into a Fistula; which is then wont more especially to happen, when the matter is sharp and malignant; or otherwise when the Inflammation is seated in the joynts, in the Arse-hole (as we cal it) and such like parts.

The evacuation of Pus *or corrupt matter out of an Impostume.*

Now as for the manner of Evacuation, it is (as hath likewise been shewn before, in the third Chapter, touching an Impostume in general) twofold; either by the opening of the part, or else by insensible transpiration. And very commonly indeed, if not for the most part, that kind of Impostume which we cal *Vomica* (which is an Impostume ful of snot-like filth or matter) is forthwith opened; and that also very conveniently, and usually with good success. Yet notwithstanding *Galen* in his third Book of the Method of Physick, Chap. 15. doth not instantly proceed to opening, but first of al assayes what may be done by exhalation and insensible discussion. And this is especially practised in that affect which we term the Kings Evil, and generally in al Swellings in the Neck, Arm-holes, and al the glandulous kernelly parts. For if such like parts should be opened and altered by the ambient Air, it is possible (and indeed very frequently seen) that from thence the Ulcers are rendered either altogether incurable, or at least more difficultly curable, and of longer duration. But here we cannot be over cautious. For whenas this said resolution and discussion of the purulent corrupt matter happeneth but seldom, and never but after a longer tract of time, so that thereupon there is great cause to fear, lest that it should in the mean while corrupt the neer neighboring parts, and cause windings to and fro in the part affected; then in this case, al the circumstances ought heedfully to be weighed, and duly considered. For if that the *Pus* be good and laudable, thin, not much of it, not scituate in a deep place, but rather seated in the superficies; and if the Skin be softer and thinner, then perhaps we may have some ground to hope and expect a discussion. But if the case stand quite contrary, and it be so that the said *Pus* be not good and commendable, but that it be thick, fixed in a deeper place than ordinary, and likewise if the Skin be thicker than is convenient; then to attempt resolution, and to defer opening, wil be a course altogether safe, and void of danger. But where there is any hope given of resolution, we must then make use of the stronger sort of Digestives to accomplish this discussion. Of this kind is that Medicament which *Paulus Ægineta* (in his fourth Book, Chap. 18.) hath prescribed; which drives forth those Impostumes that are already throughly concocted, and quite and clean discusseth and scattereth such as are not concocted.

Take *of the stone* Pyrita, *Ammoniack, of each one ounce and half: of Bean Meal six drams: let them be incorporated with liquid Rozin, and let the liquid Medicament be spread upon a Skin, and not taken away until it fall off of its own accord.*

This likewise is singularly useful;

Take *Ammoniack two ounces: Galbanum half an ounce: Lithargyrie three ounces: old Oyl as much as wil suffice: make a Liniment.*

But if (which but seldom happens) the *Pus* cannot insensibly be discussed, then it is sensibly to be emptied forth and evacuated by opening the Impostume. Now either the Impostume is broken of it self, or else it is opened by art. The Impostume is opened of it self, whilst that we expect and wait until the *Pus* corrode and fret away the skin it self; which we are allowed to do, in case the Tumor or Swelling be not so very great; but especially if it be in the outwardmost part of the Skin and flesh, and under the Skin that is not over thick. But it is not evermore safe to expect a Spontaneous and voluntary opening. For (as *Galen* writes upon this very subject, in his second Book to *Glauco*, and sixth Chapter) when Tumors which arrive at Impostumes shal be long neglected ere they be launced and cut (either by reason of the unskilfulness of those that undertake the Cure, or the fearfulness of the Patient that is under cure, who wil not suffer themselves to be cut, but wil rather wait and expect until that in process of time the Skin be corroded and eaten through) it then very often comes to pass that the whol Skin is exceedingly extenuated by reason of the purulent matter heaped up together neer unto the Impostume, not unlike unto that which the Greeks cal *Racos*, that is, a rent Garment; from whence it is that Physitians have imposed upon it this appellation or name, *Racodes*, that is to say, rent and torn. And if this chance, the Skin in this manner and by this means extenuated wil very hardly ever after be brought to cement and unite with the part that is subjected and lieth underneath it. But now, in the first place, the said opening is not to be delayed, and a voluntary eruption of the corrupt matter to be expected, if so be that the flesh and skin be thicker than ordinarily; and if there be in that part Nerves, Veins, and Tendons. For then the Impostume is to be opened as soon as possibly it may be, lest that if the opening be deferred, the malignancy of the purulent matter corrupt and eat asunder the Nerves and Tendons; especially if the Impostume be ever a whit nigh unto the Joynts. Yea, in some certain places, as for instance, neer about the Arse, and the Sutures, we are scarcely allowed to expect the highest and utmost perfection of the said *Pus*, lest that the more profound and deep parts putrefie, and thence a long lasting, or Fistula-like Ulcer be generated.

The opening of an Impostume.

when it is to be put in practice.

And

And therefore if the corrosion or gnawing asunder of the Skin, and consequently that spontaneous eruption of the filth and corruption be not to be expected, the Impostume is then forthwith to be opened; and this ought to be performed in that place of it that is the highest and most eminent; for there the Skin is at the thinnest: and withal it is likewise to be opened at the same time, in some more sloping and inferior place thereof, that so the said *Pus* may the more easily pass forth. It is to be opened either with an Iron Instrument, or else by Medicaments. The Iron that openeth it must either be such as is heated in the fire, or else such an Instrument as is prepared to cut. We most rarely make use of the Iron heated in the fire, and never unless in case of urgent and extream necessity; as for instance, if it should so chance, that there be a Tumor in those parts that are ful of Veins and Arteries, and such other like cases. For there the dangerous flowing forth of the Blood is checked and suppressed by the fire-heated Iron. But most frequently it is opened with an Instrument that is fitted expeditely to cut; and this knife ought to be sharpened to the utmost, that so the Section may be performed without putting the Patient unto any extream and intollerable pain; and (if possibly it may be done) so that the sick party may take no notice thereof. But in the accomplishing of this work we must evermore look wel unto it, that the Sections (or cuttings) be no larger than needs must; and yet (on the other hand) not so smal, but that they relieve the present necessity; I mean, that by the Orifice of the incision the *Pus* may find an open and free passage forth. For if the Wound be less than that the corruption may rightly pass out thereat, then it wil be requisite that the part be pressed down; by which compression pain is evermore excited, and the Ulcer is rendered callous and brawny; from whence a Fistula may possibly arise. But on the other side, if the Incision be wider than it needed to have been; then both the Cicatrix or Scar will be greater (and more unsightly) than if it had been artificially made; and then likewise the parts subjected wil be altered by the ambient air; and now & then the part is thereby made the weaker. *Celsus* (in his seventh Book, and second Chapter) gives in charge, that the Incision be made after the resemblance of the Myrtle Leaf, that is, that a simple downright Section be made, and that it be so long, that when the lips thereof are dilated the Wound may bear a resemblance to the Myrtle Leaf. And sometimes one only Section doth not suffice; but (as *Celsus* there instructs us) greater turnings and nooks are by incision to be made in two or more lines. And this also is carefully to be observed, That the Section be made according to the fibres, that is, answerable to the smal strings or hairs of the Muscles. Now the Fibres proceed straight forth, and for the most part according to the length of the body, unless it be in some certain places, as in the forehead. Now this is therefore to be heeded, that so we may not hurt or hinder the motion and action of the member; which yet we need not to observe, if the Tumor be in the Superficies, and close under the Skin; but then only, when the *Pus* sticks in the very substance of the Muscle. In the first place therefore we must take due heed that we keep at a good distance from the Nerves, as also the Veins and Arteries, and that we come not nigh them. The Instruments we make use of for the opening of Impostumes are very many. The first is the Razor; then next the Myrtle Knife, which they commonly cal the Lancet; thirdly, a Knife or Instrument resembling the Olive Tree; fourthly, our Country-men likewise open Impostumes with the Pen-knife, or that with which they let blood when they open a Vein. But of necessity these Instruments must variously be used, according to the great variety and difference of circumstances. For if the Impostume be deeply seated, and the Skin be thicker than usually, then it wil be needful proportionably to make the Section so much the more profound and deep. But if it be (as we use to say) *subcutaneous*, that is, lying close under the Skin, there will then be no necessity for this so deep an Incision.

But in regard there are many that wil not admit of Section or Incision, we therefore prescribe and administer unto such persons Medicaments whereby the impostume may be opened. But those Medicaments are not al of them of one and the same sort, neither of a like efficacy; for some of them are weaker, and other stronger. The stronger sort of them are not over rashly to be administred. For they both prolong the Disease, and introduce an evil distemper into the part; and possibly they may likewise produce divers other ill symptoms. And therefore the gentler sort of them are first of al to be administred, which do rather ripen the matter and draw it to the highest part of the Tumor, and withal do there render the Skin more subtile, and cause it to become more tender, than truly and properly corrode, eat asunder, and break the Skin. And such are these that follow:

Take *Marsh-mallow roots, and white Lillies, of each alike one once: Garlick, Onions rosted under embers, the flour of Fenugreek seed, dried Figs fat and ful, of each two drams: the dough of Bread well leavened one dram and an half: Oyl of white Lillies, Butter, Swines fat, of each alike as much as wil suffice, and make a Cataplasm.* Or,

Take *Onions, Garlick, Marsh-mallow roots, equal parts of them al: boyl them to a softness, and when they be wel bruised add the flour of Fenugreek as much as any one part of them: the fat of an old Hog as much as will suffice, and mingle*

them

them wel. This following is more forcible.

Take *of sharp and sowr Leaven half an ounce, Onions rosted under live coals one ounce, Doves Dung one dram; black Soap, Swines Fat, of each alike as much as is sufficient; and mingle them.*

The Emplaster *Diachylon* mingled with Mustard Seed, Figs, and Salt, performs the same with the former.

But such like Medicaments are more especially applied unto that part in the which the Impostume is sharp-pointed; and round about it there is put to somwhat that is maturative or ripening (understand it here of simple maturatives) as *Diachylon*, which to this end is wont to have a hole made through the mid'st. The strongest sort of them are those that we call potential Cauteries; the which kind of Remedies we have described in our Institutions; among which that is the most efficacious, and withall the most safe, which is prepared and made out of Lee, out of which there is a certain sope prepared; touching which we have likewise spoken in our Institutions. Now of such a Cautery we are to take a certain smal proportion, to the quantity of half a Cicer or Pease, and then apply it unto the part after this manner. Take the Cloth that is spread over with the Emplaster, and cause it to stick close to the Skin; then in the mid'st thereof cut a smal hole, somwhat narrower and streighter than you intend the Cautery shall be. After this take the Cautery, and being somwhat moistened with Spittle apply it unto the Skin that appears and lies open to view through the aforesaid hole, and afterward lay on another Emplaster upon the former. After two or three hours remove the Cautery with the Plaister; upon the removal of which the part appears black, soft, and without any sense or feeling. And that this burnt part may be wholly taken away, let it be all over throughly besmeared with unsalted or fresh Butter, or with the fat of an Hog, or with some other fit Digestive. But if the hole be not wide and large enough, it may very easily be dilated, to wit, if either a little piece of Spunge or Gentian root, or Rape root dry be put thereinto. For these things aforesaid when they are filled full with humidity they are then dilated, and so consequently widen and enlarge the hole. The Spunge is thus to be prepared: the Spunge is to be wel soaked in the white of an Egg twice or thrice throughly shaken together; then afterwards let it be close squeezed together on all sides, and then let it be leisurely dried in the shade: a smal portion of this (when it is dried) is to be taken and put upon the Ulcer. But in regard that the crustiness thereof wil not fall off in a few daies time, and that all this while the *Pus* or filthy corruption (unless it stick immediately under the Skin) is detained and imprisoned in the Impostume, for this very cause, if there were no other, it is by far the safer way to open the Impostume with an Iron.

The Impostume being now opened (whatever the way of opening it hath been) the *Pus* or matter is to be evacuated, but yet this needs not evermore to be wholly all at once or altogether. For if the Impostume be great, and contain much *Pus* within it, neer unto the Arteries and Veins, the whole matter and filth ought by no means to be evacuated all at once, lest that together therewith much of the Spirits be likewise evacuated and dissipated, and so by this means the sick Person should be caused to faint and swoon, or be debilitated and weakned: but rather the corruption is to be emptied forth by some and some, especially if the Patient be weak, or a Woman with Child; or in case the Patient be a Child, or lastly, if the sick party be very aged. When the *Pus* is evacuated, if either pain manifest it self, or else any reliques of the matter not suppurated appear in the circumference, and it be so that the *Pus* it self be not wel and perfectly ripened; then the pain is to be mitigated, and more especially the remainder of the matter is speedily to be converted into the said *Pus* by some concocting Medicament, which they commonly call a Digestive. And such is that which is made of the Oyl of Roses, and the Yelks of Eggs: for it greatly mitigates the pain, and helps forward the generating and breeding of the *Pus* so often mentioned. Or,

Take *Turpentine one ounce, one Yelk of an Egg, the Pouder or Dust of Frankincense one dram, Oyl of Roses three drams; mingle them wel together.*

Likewise the Emplaster *Diachylon simplex* is very profitable in this case.

When this is once accomplished, even while the concoction doth yet appear, we must come to those things that throughly cleanse and purge it: for neither can there flesh be bred, nor any conglutination (by drawing together the Lips of the Impostumated part) be made, unless the part be first cleansed. Which to effect,

Take *Clear Turpentine one ounce, Honey of Roses six drams, the Yelk of one Egg; let them boyl together a little, and afterward add of Saffron one scruple, and a little quantity of Barley meal.*

If there be need of a greater cleansing, you may then add the juyce of Smallage. As,

Take *of crude Honey, Barley meal, of each alike, one ounce; of the Juyce of Smallage half an ounce, Saffron half a scruple; and mingle them.*

If yet there be occasion for a more forcible cleanser, there may be added of the *Unguent Egyptiack* as much as wil suffice.

Centaury the less, and round Birthwort is here likewise very useful. As,

Take *the juyce of the lesser Centaury two ounces, Smallage one ounce, Honey three ounces; let them boyl together, and after add of Barley meal,*

and

and the Vetch Orobus, *of each six drams: when they are taken from the fire, add of Turpentine one ounce, of the Pouder of the Flower-de-luce root one dram; mingle them.*

The Impostume being throughly cleansed, such Medicaments as breed & cause flesh are to be administred. Now of what sort these are, *Galen* in his third Book of the Method of Physick, the second, third, and fourth Chapters teacheth us at large; and we have likewise declared them in our Book of Institutions. As for example,

Take *Frankincense, Mastick, of each half an ounce, Colophony two ounces, Oyl of Roses and Honey, of each as much as is sufficient; let them be mingled.* Or,

Take *The greater Comfrey one handful, Betony, Saint Johns-wort, Horse-tail Grass, of each half a handful; boyl them in Wine, and bruise them wel: out of the mash of them squeez forth a Juyce, and add of Frankincense and Mastick, of each one ounce & half; Dragons blood an ounce, Honey and Turpentine, of each a sufficient quantity; boyl them until the juyce be consumed, and make an Unguent.* Or,

Take *Myrrh, Aloes, Sarcocol, of each an ounce; Honey six drams, White Wine as much as wil suffice; boyl them to an indifferent thickness.*

When the Ulcer is filled up with Flesh, then those Medicaments which we cal *Epulotick*, that is, such as bring to a Scar, are to be administred; of which we have in like manner spoken in our Institutions; such as are, the Emplaster *Diapalma* or *Diachalciteos*, *de minio* of *Vigo*, and others, which are every where known.

Chap. 6. *Of the* Sinus *in the Tumor.*

But it oftentimes so happeneth, that although the said *Pus* or snotty filth be emptied forth of the Impostume, yet notwithstanding it becomes again replenished; from whence it comes to pass that the adjacent Skin doth not close, fasten and grow together with the Flesh that is underneath it; but there is a certain cavity or hollowness left to remain; and at length there ariseth a certain difficulty, if not impossibilily, of cementing and conjoyning the skin with the Bodies lying underneath; which affect the Greeks cal *Colpos*, and the Latines term it *Sinus*; to wit, when the enterance into the Impostume and Ulcer appears narrow enough: but the deeper and more profound part thereof diffuseth it self into a breadth.

The Causes.

Now for the most part, the Causes of this *Sinus* are Impostumes or Suppurated Tumors, overslowly opened, or not wel cleansed. For the corruption if it be longer detained in the deep place than it ought to be acquireth a certain kind of sharp corroding quality, and there causeth divers winding passages and turnings, such like as we find in Coney-borrows; and so unto the part in this manner affected there flow together from the neighboring parts, yea from all the whole body, such excrements and such humors as superabound; from whence afterwards it chanceth, that this kind of *Sinus* or windings to and fro can very hardly be conglutinated and filled up with Flesh.

The Differences.

But now of these *Sinus* there is an exceeding great diversity: for they differ not only in the dimension of quantity (that one should be less and shorter, and another more deep or broad) or in their figure (that one should be straight, and another full of turnings, of this or that figure) but most especially they differ in the manner of their scituation and position; because that kind of difference doth not a little vary the Cure. For that which tends upwards affords us a better hope and surer expectation of cure, seeing that by its orifice the *Pus* may the more readily flow forth and be evacuated. But that which tendeth downwards doth longer retein the said *Pus*; which being kept in doth further corrupt and corrode the parts. Wherefore such a *Sinus* is not to be cured, unless you open it on the adverse or opposite part, that so the *Pus* may freely come forth out of it. Now that the Physitian may not be ignorant of these Differences, but that he may know and well understand whither the *Sinus* reacheth, and how great it is, an exact and strict search must be made thereinto by Tents, or otherwise with those Silver Instruments (we cal them Probes) wherewith Chirurgeons are wont to search unto the bottom of deep Wounds; as likewise by Wax Candles (or the like) gently conveyed down into the very deepest part of the *Sinus*. And withall we must do our utmost endeavor, that the *Sinus* may be speedily cured; for unless it be spedily cured it contracts to it self a certain callous or brawny superficies; and in process of time it becomes exceeding hard; neither will it afterward be cured without much difficulty and danger.

Notwithstanding, what hopes there may be, the qualities of the part it self that is affected do evidently demonstrate, and chiefly the matter which flows forth out of the *Sinus*. For if it be much, not digested; if there be pain sensibly felt in the *Sinus*, or if a Tumor or Swelling appear, as yet there is but small hopes of its Cure: but then if the *Pus* be but little in quantity, if it be good, white; if there be present no pain, and all the whole place be equal; it is a great and strong Argument that the *Sinus* is already filled with Flesh.

The Cure.

As for what concerns the Cure; since that hollowness & solution of Unity are the Causes of the

Sinus, the solution of Unity points us out to the procurement of an uniting; but the Cavity instructs us, that repletion ought to be endeavored. But now those things that stand at a distance cannot be united, unless first that which is hollow be filled up; whereupon the Cavity must in the first place be repleniſhed. But the Cavity can by no means be filled with fleſh, unleſs the temper of the part be right as it ought; and that the ſaid *Sinus* be free and clean from al its impurities. And therefore we muſt primarily provide by a ſedulous endeavor, that if there be any diſtemper preſent it may be removed, and that the *Sinus* may be wel and throughly purged. And moreover, unleſs that either the Orifice of the ſaid *Sinus* look downward, or that the Member may be ſo placed that the matter may freely flow out of it, before any thing elſe be done a way muſt be opened, and a paſſage forth made for the *Pus* or filthy corruption. If the Orifice of the Impoſtume lie open toward the inferior parts, the filth hath then a free paſſage forth, and ſuch a like *Sinus* by the application of Cleanſers is eaſily cured. But then if the Orifice be in the ſuperior place, there is a neceſſity that we forthwith aſſay to open a free vent and paſſage forth for the corruption.

And this may be done in a twofold manner; either by diſſecting the whol Cavity, or at leaſt by opening the Orifice in the inferior part. Now of a truth it is the more convenient of the two that we open al the whol *Sinus*; ſince that by ſo doing the Ulcer may the more eaſily be purged and healed. But becauſe we are not evermore allowed to put this in practice, to wit, when the *Sinus* is great, and that the whol part may not be diſſected without danger; therefore ſometimes we only open the *Sinus* in the bottom thereof. Which being done, and the *Sinus* opened, it is carefully and throughly to be cleanſed and dried, leſt that there be any of the *Pus* left remaining. For if there be any of it left behind, from thence Fiſtula's and recidivations or Relapſes are wont to take their Original. And although the parts may ſeem to be conglutinated, yet notwithſtanding they do not rightly cohere or ſtick together, but afterwards they do again part aſunder. But now, to the furthering of the evacuation of the ſaid *Pus* the uſe of Swathbands & Pillows doth very much conduce; if with them we ſtreightly compreſs and ſtrictly keep down the part affected from the higher part of the *Sinus* towards its Orifice. Now the Medicaments fitted for this uſe and purpoſe are, the Water of the Decoction of Barley, *Melicrate* (that is, Water and Honey ſodden together) which is of it ſelf ſufficiently purgative, ſo that alone it is able to render that *Sinus* whoſe orifice is in the inferior place apt and fit for glutination or cementing together; *Mulſum*, that is, Wine and Honey ſodden together, which both corroborate, and together withal purgeth; Rozin, Turpentine, Honey of Roſes, Barley meal, Bean meal, the flour of *Orobus* or bitter Vetch, of Lupines, Lee, Spirit of Wine, Bath-Water, Allum Water, Oxymel, Unguent Ægyptiack; which are the ſtronger ſort of them, and to be adminiſtred only (or at leaſt chiefly) in the moſt impure and naſty Ulcers.

Out of thoſe before mentioned divers others may be made and compounded: As for example:

Take *Honey of Roſes ſtrained ſix drams: Barley meal a ſufficient quantity, to give it a thick Body.* Or,

Take *Honey of Roſes ſtrained ſix drams: cleer Turpentine one ounce: the juyce of Smallage and Wormwood, of each half an ounce: let them boyl together: and afterward add of Bean, Barley, and Lupine Meal, of each alike, as much as will ſuffice, and then mingle them throughly.*

But when (as now and then it happens) the *Sinus* are manifold, or otherwiſe when they are of an extraordinary depth, ſo that to open them is altogether impoſſible; neither alſo can the Unguents poſſibly penetrate throughout their whol Cavity; then (in this caſe eſpecially) liquid abſterſives are chiefly approved of, as ſuch which can inſinuate and convey themſelves into al parts of the *Sinus*. And ſuch kind of Medicaments ought to be injected by a Tunnel, or by a pipe; and ſo ſoon as the Medicament is caſt in, the Orifice ought ſometimes to be ſtopt up with a Linnen cloth or Napkin; or elſe with a piece of Silk, to prevent the immediate flowing back again of the Medicament. As,

Take *of whol Barley three pugils or ſmal handfuls: Centaury the leſſer, and Wormwood, of each alike two pugils: boyl them in Melicrate, and make an injection.* Or,

Take *of the Water of decocted Barley, Melicrate, of each two ounces: Unguent Ægyptiack, half an ounce; mingle and inject them.*

And thereupon, if by theſe kind of Medicaments the Ulcer be ſufficiently cleanſed and purged, then thoſe Medicaments that produce and breed fleſh are to be adminiſtred. For albeit Nature her ſelf generate and breed fleſh; yet notwithſtanding Art doth by Medicaments ſo far forth aſſiſt Nature, as it removeth and carrieth away the excrements which much hinder her in her operation. For it is generally wel known that any part whatſoever (although it be ſound) doth generate a twofold excrement, and drive it forth without the body; one whereof is more thin, which for the moſt part breathes forth by inſenſible tranſpiration, and is alſo not unuſually evacuated by ſweat; the other more groſs and thick, which outwardly adheres unto the body, and by a general name is termed Scurf, filth, or naſtineſs. Theſe excrements whenas they are reſident in the aggrieved part, being weak and infirm, and cannot by the ſtrength of Nature be expelled and driven forth

forth of the Ulcer, they ſtil perſiſt to ſtick there in the Ulcer, and the thick excrement renders the Ulcer filthy and foul; but the thin excrement makes the Ulcer to become moiſt. Which ſaid excrements ſince that they are an impediment to Nature in the breeding of fleſh, they are therefore altogether to be removed and taken away; and to ſpeak more perſpicuouſly and plainly, the filth and impurities thereof are to be throughly cleanſed and wiped away from off the Ulcer, and the moiſture is to be dried up.

Now thoſe Medicaments which accompliſh the aboveſaid intentions are called *Sarcoticks*, i.e. Breeders of fleſh; not that they themſelves can indeed really generate fleſh (which is the peculiar work of Nature alone) but becauſe (as we have ſaid) they take away the impediments, and ſuffice Nature with ſo good a blood, that from it good fleſh may eaſily and ſoon be ingendred. Now ſuch like as theſe are dry, yet are they not of an over dry quality, but of ſuch a faculty as very little (and that likewiſe moderately) exceeds the temperament of the affected or grieved part. But ſince that there is not the ſame kind or meaſure of drineſs in al Bodies and Members, thereupon the ſame matter is not uſeful for the engendering and breeding of fleſh in al bodies and members; but thoſe bodies and members which are drier require and need the dryer Medicaments; but thoſe that are more humid and moiſt cal for Medicaments that are leſs drying. The more mild and gentle of them are, Frankincenſe, Barley meal, Bean meal; the ſtronger are, the meal or flour of *Orobus* or bitter Vetch, Flower-de-luce root, Root of *Ariſtolochia*, Myrrh, Tutia, Pomphorlyx, and the like. From which we may very fitly and commodiouſly prepare Compoſitions for the preſent occaſion. As,

Take *Turpentine two ounces: Frankincenſe, Maſtick, Colophony, of each half an ounce: Wax, Oyl of Roſes, of each ſufficient; make an Unguent.*

But this following is ſomwhat ſtronger and more forcible. Viz.

Take *Round Ariſtolochia, Flowerdeluce, the greater Comfrey, of each two drams: Maſtick, Frankincenſe, Myrrh, Aloes, of each one dram: Honey and Turpentine, of each ſufficient, and throughly mingle them.*

If the body be more than ordinary dry, and if that hard fleſh be to be generated, and that the Ulcer it ſelf lie open, we may alſo then adminiſter Medicaments in a dry form, and make up Sarcotick Pouders, to ſtrew thereupon. As,

Take *Frankincenſe, Maſtick, Colophony, of each alike: make a Pouder.* Or,

Take *Aloes, Frankincenſe, Sarcocol, Dragons blood, of each as much as ye will, and make a Pouder.*

But if the *Sinus* be not open, then liquid Sarcoticks are by a Funnel to be injected after the ſame manner as the cleanſers were; and the orifice being cloſe ſhut up, they are for a while to be left in the *Sinus*. For which end and purpoſe there may be injected auſtere or ſharp Wine in which Frankincenſe hath been boyled; or the Decoction of Ariſtolochia, the great Comfry which ſome cal Wall-wort, Horſetail, Roſes, and the like, with Wine; unto which may be added, Frankincenſe, Myrrh, Aloes.

But now whether or no by means of theſe Medicaments the deeper parts of the *Sinus* are wel cemented and exactly conjoyned, that which floweth forth wil evidently demonſtrate: which if it be but little in quantity, and wel digeſted; and moreover if there be no pain perceived in the *Sinus* it ſelf, it is an argument that there is a perfect conglutination effected. But if the fourth, or (at the utmoſt) the ſeventh day ſhal be paſt, and yet notwithſtanding a crude raw humor ſhal iſſue forth of the Ulcer, it is a ſign that as yet the *Sinus* is not exactly united and conjoyned, and that fleſh is not as yet therein bred; whereupon thoſe Medicaments that more forcibly dry (yet notwithſtanding without any kind of mordication or biting) are then to be adminiſtred. Whenas now the *Sinus* is in a manner filled up, ſome one or other of the agglutinating Remedies ought to be applied, which may gently and without any the leaſt acrimony cloſe together the tender fleſh that is generated and bred (of which ſort are thoſe which by the Greeks are called *Enaima*;) that ſo they may as it were conjoyn the divided parts, and may likewiſe cure the new made Wounds: of which ſort *Galen* (in his ſecond Book of the compoſition of Medicaments according to their ſeveral kinds, Chap. 21. and 32.) hath given us a deſcription of good ſtore of them.

After that the agglutinating Medicament hath been applied and laid to, *Galen* directs us to caſt round about it a new Spunge made as fair as poſſibly may be with ſweet Wine; or with *Mulſum*, i.e. Wine and Honey ſodden together; which ſaid Spunge others alſo uſe to throughly ſoak, and thereby fil it ful with the Decoction of Pomegranate Rinds, Roſes, and the like; to wit, that it may dry it, and receive in the filthy corruption iſſuing forth of the *Sinus*, which might otherwiſe eaſily corrode the part, or excite and cauſe therein an intollerable itching: and this ſaid binding round about he would have to begin from the bottom of the *Sinus*, and from thence that it tend toward the orifice. And likewiſe about the bottom thereof let Swathbands be rolled as hard and ſtreightly as may be (provided ſtil notwithſtanding that it cauſe not pain) and then let them be looſened by degrees, and by little and little, until you come to the very mouth of the *Sinus*; in the which ſaid mouth let the Medicament be tied unto it after a looſe manner; neither let it too cloſely ſtop up the orifice, but leave a

passage forth for the *Pus* or snotty matter; unto which end, and for which purpose also let the Emplaster which is laid thereon have a hole cut (with a pair of Shears) in that same very place.

And this was the way and method used by the Ancients for the curing of a *Sinus*, and generally al sorts of hollow winding Ulcers; and to speak truth, it was sufficiently useful and commodious. Yet notwithstanding, *Franciscus Arcæus* in his second Book of the Curing of Wounds, the seventh Chapter, tels us of another far more easie and compendious course that he himself had found out and discovered in curing Apostems newly opened; whereby on the third, or on the fourth day at the furthest, all the aforesaid Cavity of Apostems might be remedied, and perfectly cured, by drawing together what was divided; (which operation we cal commission and conglutination of the Impostume) so that nothing should be left gaping, beside the opening or incision place, which was made by Art to the end that thereby the *Pus* might flow out, and be pressed forth; and that al this should be effected without any the least danger to the sick party, without much (if any) pains and labor, or any other difficulty. Now his way and method of Curing was as followeth. If the Tumor or Apostem be great, then (saith he) in the first place let it be opened in the best manner that may be; so that the little finger may be put into the orifice, and that thereby al the *Pus* that is contained within the Impostume may be permitted to flow forth; and may likewise be thence expelled by a gentle compression of the place it self. The *Pus* being once expelled and evacuated, let the mouth of the *Sinus* be stopt with a Tent; and then an artificial Pillow or Cushion being laid and fastened down thereon, let it so remain (without removal) until the next day following. The day following, the Ligature being loosened, let the Ulcer be purified and carefully cleansed from al the *Pus*, if haply there be any left remaining underneath. After this is done, let a Pipe or smal Cane of Lead be put into the orifice; the which let it be as big and large as is the Orifice it self; and let it reach even unto the Cavity or hollow place; but let it not by any means be forced any further. Upon this let the Basilick Emplaster spread upon a Linen Cloth be imposed; in the which also the pipe may be contained, that it fal not forth; yet nevertheless leave a hole at the very Orifice of the Leaden Pipe or Cane. Afterwards, on either side of the Cavity let there be put triangular Pillows or Cushions (of which before) on either side one, so that al the hollow space may be filled up with either Pillow, &c. But let the Orifice of the *Sinus*, in which is the Leaden Pipe be left free and open; neither let it be stopt up by the aforesaid Pillow, nor any waies obstructed by the Ligature or binding; that so al the *Pus* that lieth underneath may be throughly purged out: afterward let the place covered by the Pillows be rolled about with a Swathband, so that it may be without the least pain; and let it be so ordered, that the Ligature may begin at or from the bottom, and tend toward the orifice; that so by this means al the *Pus* or filth that is within may be forced toward the Orifice, and through it may be pressed forth. The *Sinus* thus bound about is to be left in this manner until the day following; on which, the Ligature being loosened, we ought by making strict enquiry to find out how much of the Cavity remains; that so we may be throughly certified, Whether or no the aforesaid Pillows or Cushions did touch upon the places. For al those places which were subjected by the Pillows, &c. wil al of them be found conglutinated and fast closed together. The which when we have discovered, the Pillows are again to be tied and fastened after the same fashion as they lay before; and so they are to continue until the next day. But now if so be that any of the Humor, or of the *Pus* seems to be left in any place, this (as before) is to be pressed forth with the Pillows fastened by the Swathband; together with which the gaping place doth coalesce and joyn close together. In this manner so soon as the parts are closed together, let the Pillows be removed; and then let there be imposed upon the Ulcer a Linen cloth spread over with the Authors *Leonine* Emplaster, or such other like Plaister, as suppose the Emplaster *Diapalma*; and you may not forget to wipe and cleanse it six or eight times every day.

But yet notwithstanding, as touching this way and manner of curing the *Sinus* and Cavities, it is first to be taken notice of, that this same doth succeed most happily in Apozems newly opened, and in them only: for as for an old *Sinus* (where all is not wel within, and which almost declines unto callous Ulcers and Fistula's) the former way and manner of curing it is far better and safer. Moreover, this is likewise to be observed, that we ought wel to look, whether or no there remain any relicks of the indigested matter, spread thorow-out the part; which easily comes to be known by some apparent Tumor or Swelling; as also by its redness of colour. For otherwise, and as long as any thing preternatural sticks in the part, agglutination (as we term it) or closing up of the Orifice is not to be expected; neither is it to be so much as hoped for. And therefore be sure that the *Pus* it self be likewise cleanted and purged in the best manner that possibly you can.

Thirdly, This also is to be heeded, to wit, whether or no the place may conveniently enough be rolled about with Swath-bands, and likewise whether the aforementioned Pillows or Cushions be streightly fastened, and tied down close enough, that so they may both compress and keep

keep down the ſevered and diſunited parts, and alſo preſs forth the *Pus* or filthy ſnot-like matter. For if ſo be that the Swath-bands gape, and that the Pillows preſs not down the part as they ought, then neither is there any *Pus* preſſed forth, nor doth the part coaleſce and meet together.

Chap. 7. *Of the Tumor* Eryſipelas *or* Roſa.

THat Tumor which the Greeks cal *Eryſipelas*, but we here of this Country (commonly) *Roſa* (from its roſie color) is altogether to be referred unto, and ſo to be accounted in the number of the Tumors that take their original from the Blood. All the Latines (*Celſus* only excepted, who retains the name *Eryſipelas*) term it *Ignis Sacer*; we in Engliſh call it St. *Anthonies* fire; of this *Ignis Sacer* the Poet *Lucretius* makes mention in his ſixth Book.

The Body all at once with Ulcers brand
grows red,
As 'tis, when Ignis Sacer *hath the whol ore-ſpread.*

This Tumor is moſt an end by Phyſitians ranked among the Cholerick. But yet there is ground and cauſe enough of doubting, from what humor it derives its beginning and Pedigree. For *Galen* himſelf ſeems now and then to ſtagger, and not alwaies to ſtand to what he had ſpoken concerning it. For in his ſecond Book to *Glauco*, and firſt Chapter, he expreſly writes, that the moſt thin and hot Blood, or Choler together with Blood (to wit, when both of them are hotter than is behooful) is the Cauſe of an exquiſite *Eryſipelas*; and there he determines that meer & pure Choler is not the original efficient cauſe of this ſaid Tumor, but rather of that which we uſually call *Herpes*. And in his Chap. 9. concerning Tumors he aſſerts, that *Herpes* is bred or cauſed, when a cholerick fluxion (being indeed purely and exactly ſuch) happens to be excited, and to exulcerate the Skin; but that when this ſaid cholerick flux is mingled with a wateriſh matter and with blood, & ſo is leſs ſharp, and when it rather ſwels up the part into a Tumor then exulcerates it, that then an *Eryſipelas* is excited. But contrariwiſe, in his Book of black Choler, Chap. 5. in his fourteenth Book of the Method of Phyſick Chap. 1, 2, 3. and B. 17. Chap. 2. in his Book of the Differences of Feavers, Chap. 5. and in his Book of the way of curing by Blood-letting, Chap. 8. and in divers other places, aſſerts that Choler is the cauſe of this Tumor: which latter opinion of *Galen* moſt of our Phyſitians follow.

But truly, if we lay aſide the Authorities and Opinions of the Ancients, and look wel into the thing it ſelf, and if we confer the name of an *Eryſipelas* upon that Tumor that is ſo well and commonly known unto our Country-men; and laſtly, if we take good notice of thoſe things that dayly befall the ſick Perſons in a Diſeaſe ſo well known; we ſhall then (without any ſcruple) judg the Opinion of *Galen* (which he propounds unto *Glauco*, in his ſecond Book and Chap. 1. and in his Book of Tumors, Chap. 9.) to be by far the more true and probable.

For the very colour it ſelf of the part affected (being altogether roſie) inſtructs us, that Blood rather than Choler is the cauſe of this Tumor. And although this kind of Tumor doth now and then from red or ruddy become yellowiſh, yet notwithſtanding this is not altogether true of every *Eryſipelas*, but only of ſome one certain ſpecies and difference thereof. Moreover, the humor that excites and cauſeth this Tumor is not altogether ſo ſharp and tart as is Choler; and for this cauſe doth neither exulcerate, nor produce extream heat, or over vehement pain. Notwithſtanding the Blood that excites this Tumor is the thinneſt and moſt intenſely hot, and it is vulgarly ſaid to be bilious or cholerick; the ſame that *Galen* alſo tels us in his ſecond Book to *Glauco*, Chap. 1. where he writes, that Choler alone (when it lieth hid and ſecret, and conſiſts in ſome one member) doth excite and cauſe the Tumor *Herpes*. But then if ſo be that the fluxion ſhall be mingled, and conſiſt of blood and yellow choler, (being both of them hotter than is meet) or elſe from the blood in this manner waxing hot, and being according to its ſubſtance moſt thin, we then call it an *Eryſipelas*. For albeit that *Galen* in very many other places aſſerts an *Eryſipelas* to proceed from Choler; yet notwithſtanding, what he means and intends by Choler, he hath ſufficiently declared in the place before alleadged. And if we conſult experience, and thoſe accidents that betide the ſick Parties, we ſhall then find that he could not intend any thing but that Choler which they term natural and alimentary or nouriſhing, that is to ſay, the hotteſt and thinneſt part of the blood, but ſuch as is now grown extreamly hot, & therefore the neereſt that may be to Choler. But now, whatſoever kind of Choler we aſſign to be the cauſe of this Tumor, whether yellow, or pale, or like the ruſt of Braſs, or Leek-coloured, they wil not any of them agree with thoſe things that happen in this Tumor. Furthermore this humor hath conjoyned with it a depraved quality, and a peculiar ſort of corruption; and before ſuch time as it breaks forth it exciteth and cauſeth exceeding great ſtreights, not much unlike to thoſe that the Plague (upon the firſt invaſion) is wont to produce; and therefore the ſame kind of *Alexipharmaca* or counterpoyſons that we make uſe of in the Peſtilence are here likewiſe to be adminiſtred, for the expulſion thereof.

Notwithſtanding, the words of *Galen*, and of other Authors (that affirm the original of this Tumor to ſpring from yellow Choler) may be drawn to a better ſence; I mean, that they may be more rightly

rightly interpreted, if we say, that by Choler is to be understood the natural part of the blood, which is more thin and hot, and which is very commonly called Choler; but it were more fitly and properly named a bilious or cholerick blood; the which so soon as it begins to wax intensly hot, and to boyl, it then excites this kind of Tumor. And very frequently there is also herewithal mingled a certain portion of a most subtile thin and intensly hot whey (the which if thou hast a mind, and art pleased to cal it a bilious & cholerick whey I wil not gainsay or oppose thee) and then there is bred an exulcerated *Erysipelas*, yet only superficially; like as oftentimes it is wont to happen in the Face, when there arise and appear little bladders ful of a waterish humor; and then the Skarf-skin alone is affected, and parts asunder. But if (together with it) the Skin it self shal be exulcerated (which ever and anon chanceth in the Thighs) then we may conclude that adust humors are therewith mingled; and this kind of *Erysipelas* is said to be, not pure, or if you will impure.

But of this Tumor enough hath been spoken in the second Book of Feavers, Chap. 16. which here we judg it not fit to repeat, in regard that there the Reader may by perusal be fully acquainted with what hath been written. I wil only repeat this, that the first rise of this affect is from a Feaver, or more plainly, that the affect is primarily and originally a Feaver. For neither doth an *Erysipelas* (or Rosa) invade the part but with a Feaver; which oftentimes a day or two before it breaks forth is wont exceedingly to afflict and excruciate the sick Person. But this Feaver is critically determined (as we wont to express it) and the Patient freed therefrom by means of this Tumor: and thereupon it is, that oftentimes a pain or some kind of swelling is perceived in the Glandules under the Arm-pits, or else in the Groyns; until that at length Nature shall have driven forth the matter unto some extream part of the Body: for then the Feaver is wont to cease, albeit the Tumor is wont to stick and continue in the part affected, for a certain space after.

Touching the Cure, this likewise is to be observed (like as it hath been more at large declared in the place before alleadged) that it ought to be altogether perfected and compleated; and we must use the utmost of our endeavor, that the humor (the conteining cause thereof) may be called forth and not retained therein; since that by the deteining thereof greater evils are wont to be introduced and made way for: which may sufficiently appear even by the example of that Country-man (or Peasant) mentioned by *Gulielmus Fabricius*, in his first Century, Observ. 82. who having an *Erysipelas* in his left Hand (and by the advice of a Barber-Chirurgeon for some daies anoynting his Hand and Arm with Oyl of Roses) a Pain, an Inflammation, and other symptoms were from day to day more and more augmented; insomuch that at length the whol Hand was corrupted (and altogether rendred incurable) by a Gangrene.

Chap. 8. *Of a* Bubo:

A *Bubo* likewise appertains unto Inflammations. For a *Bubo* (as *Galen* defines it, in his Book of the Difference of Feavers, Chap. 5. and in his second to *Glauco*, Chap. 1.) is an Inflammation of the Glandules in the Groyns. For the Glandules being by Nature ordained and appointed, that unto them the superfluous Humors should be expelled from the principal parts; if they (and together with them the blood) shal chance to be thrust forth altogether (and as it were by heaps) unto the Glandulous parts, then an Inflammation is excited; and this happens most and ofd, and especially in the Groins; and sometimes also under the Arm-pits, and behind the Ears; which latter Inflammations behind the Ears are commonly termed *Parotides*.

But now, The Humors that stir up and provoke Nature unto the aforesaid expulsion being very various, hence it is that the differences arising from *Bubo* are likewise exceeding various and different. For one while the Humors are said to be simply vitious or vitiated, so that they have no malignity conjoyned with them; and from these originally proceed those *Bubo's* that are not malignant: but then again (otherwhiles) the matter is malignant, and thence the malignant *Bubo* is produced; and this again according to the variety of the malignant matter, is either pestilent, or else that which we call venereal. But in regard that we have already treated of the Pestilent *Bubo* in our Book of Feavers, and that the other which we call Venereal belongs unto the Tract touching the French Pox, therefore we wil discourse of the *Bubo* at large only, and handle it as it is in the general.

The Causes.

Now every *Bubo* whatsoever hath its original from a preternatural effusion of the blood into the Glandules in the Groyns, or the Arm-holes; the which notwithstanding hath evermore conjoyned with it some certain vitious and corrupt humor, of what sort soever it be, that excites and stirs up Nature unto the aforesaid excretion, or as we usually term it, expulsion. From whence also the antecedent, yea and the external causes likewise which make for the generation of that humor are very various. Notwithstanding the strength of the principall parts is for the most part evermore conjoyned therewith; which expel forth whatsoever is offensive and burdensom unto themselves unto these ignoble parts, and to the Emunctories.

Hieronymus

Hieronymus Fabricius ab Aquapendente determines, that some kind of *Bubo's* have their beginning and original only from the store of Blood, and that certain of them by the way of expulsion are bred from the vitious blood; and that the other Diseases follow, and are excited at the time and Instant of the *Crisis*.

But in very truth I cannot think that a *Bubo* may be excited from the abundance of blood only, but that it hath evermore conjoyned vitious humors which provoke Nature to the expulsion. This notwithstanding is most true and certain, that one while a *Bubo* doth follow upon another Disease, and is excited by the *Crisis* whether perfect or imperfect; and as soon again, without any other Disease preceding it. For although only those Tumors which follow upon other Diseases may properly be said to be caused by the *Crisis*, yet notwithstanding even those likewise that arise without any other Diseases are excited by Nature in her expulsion of the depraved and burdensome humors.

The Signs Diagnostick.

The *Bubo* is known by this, to wit, that in the Groyns, or under the Arm-holes there appears a Swelling or Tumor, with a certain kind of tenitency or resistance, with a redness of color, and likewise with pain; and for the most part also a gentle Feaver accompanieth it. And this is most certain and sure, if the *Bubo* happen to be by the *Crisis*, that then a Feaver or some other Disease went before, which upon the appearing and breaking forth of the *Bubo* is lessened and abated; and then the signs of a good and hopefull *Crisis* preceded; the which if so be they are absent, then the *Bubo* is to be accounted for symptomatical. And then truly if there appear no signs at all of the Pestilence, or of the French Disease, then it is a single and simple *Bubo*, and not malignant and contagious. But if there be conjoyned the signs of the Plague, the *Bubo* is then to be accounted for malignant and contagious; and evermore *Bubo's* are to be suspected, where the Pestilence invades the Patient. In like manner, if the sick Person be infected with the French Pox (commonly termed likewise the Neopolitane Disease) the *Bubo* is then also to be held for and esteemed Venereal, Malignant and Contagious.

Prognosticks.

1. *Bubos* that are not malignant, and those likewise that are not contagious, are not in the least dangerous, since that they are resident in the external parts, and are caused by Nature in her expelling forth the vitious and corrupt blood unto the weak and ignoble parts; and especially if they be forthwith suppurated, and then opened.

2. But if they be long delaied, and that their maturation be not speeded, there may be great danger; in regard that they very easily pass and degenerate into dangerous Fistula's.

3. Those *Bubo's* that are bred or excited under the Arm-holes are sooner maturated, since that they arise from a hotter kind of blood; such as is that which the greater Vessels neer neighboring unto the Heart do extrude and thrust forth; for as much as that part (by reason of the Hearts vicinity) hath more than ordinary heat, which is altogether necessary and requisite for maturation.

4. But *Bubo's* that have their original in the Groyns are longer ere they come to a suppuration; in regard that they are excited by a blood that is less hot and thick; and likewise, because they are scituate in a place more remote from the heart, and which is but meanly hot.

5. The slowest of them all in their maturation are those *Bubo's* that are behind the Ears; upon this account, namely that they proceed from a colder kind of matter, and have their residence in a colder place.

6. What we are to think and judge of Pestilential and Venereal *Bubo's* hath been already shewn in its own proper place.

The Cure.

When a *Bubo* that neither is Pestilent nor Venereal is excited (Nature unburdening her self of that, whatever it be, that is offensive and troublesome unto her and expelling it unto the external ignoble parts) Natures operation and endeavor is by no means to be hindred, nor the matter to be driven back again unto the internal parts. And first of al, we must duly weigh, whether or no Nature hath excited the *Bubo* by the *Crisis* (and that a perfect one) and that thereupon the sick Person be discharged of the Disease, and that there be present and apparent the signs of a good *Crisis* or judgment; for then in this case (according to *Hippocrates* his Precept, Book 1. Aphorism 20.) there ought nothing to be moved; but the whole business is to be committed to Nature; and means must be endeavored, that either the *Bubo* may be discussed, or else that it may most speedily be maturated and brought to a ripeness. But then if in truth the *Bubo* be critical, and that the *Crisis* notwithstanding be an imperfect one, the humor is then yet further to be attracted unto the part affected by the application of Cupping-glasses, or by Medicaments made of Leaven, black Soap, old Hogs grease, the Rosin of the Pine Tree, *Diachylum* with Gums, and such like.

Again, If there be a *Bubo* generated, no other Disease preceding, neither then (as hath been said) is Natures motion in the least to be impeded. But yet notwithstanding the great abundance of blood is to be lessened by the opening of a Vein; which yet is so to be instituted, that Natures motion to the part affected may be holpen forward

forward and furthered, rather than hindered. If also (which very often chanceth) vitious Humors shal happen to be conjoyned together with the blood, they ought to be evacuated.

The remaining part of the Cure in al these *Bubo's* which are not malignant and contagious is to be ordained and ordered like as in other Inflammations. Yet notwithstanding this one thing is wel to be observed in the first place; because that such Digestives as are administred ought to be of the stronger sort, and more forcible than in other Inflammations; in regard that the Glandules are parts that are more cold than ordinary, and more ignoble than the other, and have not any exquisite sense; we advise therefore, that a Cataplasm be made of Barley meal and Lupines mingled with Honey. Or,

Take *the Roots of white Lillies, Marsh-mallows, the wild and spirting Cowcumber, of each one ounce: the Leaves of Pellitory of the Wall, and Parsley Leaves, of each an ounce and half: boyl them in Wine unto a softness, and then bruise them well: being throughly bruised and passed through an hair sieve, add of the meal of Lupines two ounces: Oyl of Camomile and white Lillies, of each a sufficient quantity, and so make a Cataplasm.*

If the Humor be not digested it ought to be converted into *Pus*, and the *Bubo* is to be maturated or ripened; and this for the most part is the safest course. For unless this be done, as I have often observed, after some short interval of time, a new *Bubo* is wont to arise either in the same or some other part. Now the very same Maturatives that are wont to be propounded and prescribed in an Inflammation are here to take place, and to be made use of.

The *Pus* or filthy corrupt matter being bred, the Tumor is then to be launced, that so the *Pus* may most speedily be evacuated; and (the truth is) the section or cutting ought then to be appointed and instituted (in the Groyn) in a transverse or overthwart manner; since that the Tumor being cleansed after this fashion, the skin may the more easily coalesce and come together; because that whilst the Thigh is bending the Skin is united.

The *Pus* being evacuated and emptied forth the Ulcer is to be made clean, flesh to be generated, and at length the Ulcer is to be shut up with a Cicatrice or Scar as we use to cal it.

Touching the Cure of a Pestilential and French *Bubo* we have already spoken in its own proper place.

Chap. 9. *Of the Tumor* Furunculus.

THere is a certain kind of Tumor neer of kin to an Inflammation, which we term *Furunculus*; but by the Greeks it is named *Dothion* or *Dothien*; and by the Germans *Blutschwer*; to wit (as *Celsus* defines it in his fifth Book, and Chap. 28.) a little acuminated or sharp-pointed swelling together with an Inflammation and pain; and especially then when it is now already converted into *Pus*. And it hath its original from a thick and vitious blood (as *Galen* instructs us in his fifth Book of the composition of Medicaments according to the part affected) yet notwithstanding the blood not so burnt and corrupted as in a *Carbuncle*; the which Nature severing from the rest, expels and drives it forth (as offensive and useless) unto the superficies of the body. And thus the *Furunculus* ariseth in the Skin, and in the fleshy parts that are under the Skin. But there seldom breaks forth one alone, but for the most part many of them break forth together.

But now of these *Furunculus* there is a certain difference. For some of them are mild and gentle, which only invade and seize upon the Skin; others of them are malignant, which descend deeper: or otherwise (as *Paulus Ægineta* writes in his fourth Book, Chap. 23.) of *Furunculus*, one sort of them is benign and harmless, another kind of them mischievous and dangerous. And then it is truly said to be gentle and dangerless, when it resides only in the Skin; but mischievous and destructive, and not to be cured without great difficulty, whenas its Roots being deeply fixed it breaks out upon the Skin. These *Furunculus* are sometimes likewise said to be *Sporadick* (that is, such as here and there privately seize upon, and differently afflict the sick person, when they come not after an ordinary manner) and sometimes also they are Epidemick or Universal.

Signs Diagnostick.

The Signs of a *Furunculus* are, a smal and inconsiderable Inflammation in the first beginning thereof, and a Pustule or blister by degrees and by little and little growing forth, and still tending towards an acute and sharp point (not exceeding the bigness of a Pigeons Egg) with a certain kind of pain and redness of color, whenas it hath arrived at its state and perfection; which happeneth much about the eighth, ninth, or (at the furthest) the tenth day; and a *Furunculus* differs from an Inflammation in respect of its smalness in dimension: and then again, the matter which is in a *Phlegmone* or Inflammation is good blood; whereas in a *Furunculus* it is thick and vitious: and from a Carbuncle it differs, in that the matter of a *Carbuncle* is worse and more adust or burnt, and thereupon attains not unto a suppuration; whereas a *Furunculus* may attain unto maturation, and may be suppurated.

If the *Furunculus* be Epidemical and Pestilential, it is then black and green; and there is present to accompany it a malignant Feaver, together with other evil symptoms.

The

The Prognosticks.

1. In a *Furunculus* (as *Celsus* gives us to understand in his fifth Book, and Chap. 28.) there is little or no danger at al, yea, even although there be no means made use of for the cure thereof. For why it waxeth ripe, and attains unto a maturation of its own accord, and so breaks forth. But the pain accompanying it causeth us the rather to put fitting remedies and medicines in practice, that so the Patient may the more speedily be freed therefrom.

2. Among these Tubercles or little Swellings, they of them are the more hopeful, and least to be feared, which bunch forth externally in the outward Skin, and are sharp-pointed, and equally maturate and wax ripe, and are not hard, neither divided and cleft in two parts; or such as have their tendency downwards. For so saith *Hippocrates* in the sixth of his Epidemicks, and first Section.

The Cure.

We must use our utmost Skil and endeavor, that so the matter that is the cause of the *Furunculus* may be most speedily turned into *Pus*; for which end and purpose those Medicaments that have been already described and propounded in an Inflammation are here likewise very requisite and necessary. Now those things that convert the matter into *Pus* or purulent matter, are, Wheat masticated and imposed upon the place, Raisons of the Sun, Figs bruised and laid upon the part, and *Diachylum* simple or without Gums. Or,

Take *of Linseed meal, pouder of Marsh-mallow roots, of each half an ounce; of dried fat Figs in number four; Raisons of the Sun stoned an ounce: boyl them all, and then add of fresh or unsalted Butter two ounces; make therewith a Cataplasm.* Or, if the pain be more vehement and violent,

Take *Roots of white Lillies one ounce; the leaves of Mallows and violets, of each a large handful: boyl them to a softness, and pass them through an hair sieve; then add of Barley meal, Wheaten meal, and flour of Linseed, of each half an ounce; the Yelks of two new laid Eggs, the fat of a Cock, and fresh Butter, of each one ounce; and make a Cataplasm.* Or,

Take *Turpentine, the marrow of an Hart, the fat of a Calf, the fat of a Goose, Wax, fresh Butter, the best Honey, Oyl of Roses, of each half an ounce; and mingle them for a Cataplasm.*

This Tumor when it is maturated (unless it break of its own accord) is to be opened: And so soon as it is opened it ought to be cleansed.

Take *the juyce of Smallage half an ounce: Barley meal two drams: Frankincense a dram and half: Turpentine one ounce: the Yelk of one Egg, Honey of Roses as much as will suffice: mingle and make them into the form of a Liniment.*

After it is cleansed, it is to be filled up with flesh, and shut up with a Cicatrice or scar; like as we are wont to do in other Impostumes.

Chap. 10. *Of the Tumor* Phyma.

UNto an Inflammation these appertains likewise the Tumor *Phyma*, which (as *Galen* acquaints us in his second Book to *Glauco*, Chap. 1. and his third Book of the Method of Physick, Chap. 3.) is a Tumor or Swelling of the Glandules, which forthwith is augmented, and hasteneth unto a suppuration.

The place affected are the Glandules.

The Cause.

The Cause or Humor exciting the *Phyma* is blood; yet not that which is pure, but that which is Phlegmatick; and thereupon the Inflammation is not altogether so great and intense; and this kind of Tumor appertains unto the Inflammation *Oedematodes* (as we usually term it) and appeareth most an end in Children, seldom in Youths, and most rarely in those that are of ful age.

Signs Diagnostick.

It is known by a round Tumor or Swelling, and which is much elevated, little or nothing red, and almost void of pain, and in a glandulous or kernelly part.

Prognosticks.

1. This kind of Tumor is altogether free from danger; it is likewise instantly augmented; and for the most part it is suppurated and healed without the help and assistance of Medicaments.

2. The Cure is more easily accomplished in Children; more difficultly in Youths, and such as are of ful growth, and perfect age.

The Cure.

We must endeavor that it may be suppurated with al possible speed. And to this end, Natures attempt and operation is to be furthered al that may be by maturative Medicaments imposed on the part; (of which we have already spoken enough, where we treated of an Inflammation and a *Furunculus*:) which yet notwithstanding in this case, by reason of the coldness both of the part and cause, ought to be somwhat more strong and forcible: Wheat chewed and laid on is here very useful; as likewise Raisons of the Sun stoned; and also the *Diachylum* Plaister, both the simple, and that likewise with Gums. As,

Take *pouder of the Roots of Marsh-mallows, Wheaten meal, the meal of Lupines, of each one ounce; of dried fat Figs, six in number; Leaven half an ounce: then boyl them, and add thereto*

one Onion roasted in the Embers; Oyl of white Lillies as much as will suffice, and so make a Cataplasm. Or,

Take *Turpentine, the Honey found at the entrance of the Bee-hive, of each one ounce; Ammoniack dissolved in Vinegar half an ounce; Oyl of white Lillies as much as will suffice, and make an Unguent.*

For (to tel you the truth) there are some that conceive that a *Phyma* is not presently to be cut and opened so soon as it is suppurated; but they rather are of opinion that an assay should be made, that it may appear whether or no the matter may possibly be dissipated and scattered by discussives: and therefore *Galen* in his eighth Book of the faculty of simple Medicaments commends Southernwood, Parietary (commonly known by the name of Pellitory of the Wall, and by others likewise called Feverfew) Nettles, Marsh-mallow roots, and Ammoniacum softened with Honey: but this happeneth but very seldom. And therefore the safest course is, unless it break of its own accord, that it be artificially opened; lest that the long detaining of the matter should cause and produce much danger.

Chap. 11. *Of the Tumor* Phygethlon.

IN the self same Glandulous parts of the Body there is likewise another kind of Tumor excited, which the Greeks name *Phygethlon*; but the Latines cal it *Panus*, or rather (as *Celsus* in his fifth Book, and Chap. 28.) *Panis*, from the similitude and resemblance of its figure. But here the cause is more hot; and like as *Phyma* hath its original from pituitous or flegmatick blood; so a *Phygethlon* or *Panis* hath its rise from cholerick blood; as *Galen* instructs us, in his second Book to *Glauco*, Chap. 1. But most an end this kind of Tumor chanceth after Feavers; or else after the pains of some one or other part; and chiefly those torturing pains which invade and afflict the belly.

The Signs Diagnostick.

The Signs of a *Phygethlon* are, a Tumor or Swelling, hardness, heat, distension, and greater pain than might probably be expected in regard and reference unto the magnitude of the dimension of the Tumor. There is likewise sometimes a Feaver to accompany it. But very frequently notwithstanding there is not any one of al the aforesaid perceived outwardly (to wit, when and where the matter lieth deeper rooted, and is there kept concealed) but only at least some certain prickings are inwardly perceived. This sort of Tumor is long ere it come to a maturation; neither is it fitly and properly converted into *Pus*.

Prognosticks.

1. That *Phygethlon* which becomes not more hard than ordinary al on a sudden, and which albeit it waxeth not red is yet notwithstanding (otherwise) of a changed color, this *Phygethlon* (I say) is of the better sort, and there is little of danger in it. Thus *Celsus* in his fifth Book, Chap. 28.

2. That *Panus* which ariseth from an Ulcer, Pain, stroke, or from any external cause, is altogether void of danger. But that which follows upon Feavers (like as it is especially wont to fall out in a Pestilential and contagious season) or else proceeds from Swellings either under the Arm-pits, or in the Neck, is the worst and most dangerous species of this Tumor. And so *Paulus Ægineta* in his fourth Book, Chap. 22.

The Cure.

If a *Phygethlon* shal happen to arise from an Ulcer, pain, contusion, or stripes, or from any other Procatarctick cause, then (like as in other Inflammations) its increment and growth is to be impeded by coolers and Repellers. But if it be in Feavers; or that otherwise it be excited from some internal provision and storing up of Humors, then in this case Repellers have not any place allowed them; neither are they at al to be made use of; but those Medicaments that discuss and resolve are alone to be administred; and if the matter have any thing of hardness in it, then softeners are therewithal to be added; such as are Marsh-mallows, common Mallows, Orach, Chickweed, Parietary, dried Figs, Ammoniack.

But if the matter cannot be discussed, then we ought to use our utmost endeavor that it may be maturated, *i.e.* brought to a ripeness, and turned into *Pus*, by the application of those Medicaments that have hitherunto been propounded. And at length, unless it be opened of its own accord, the Impostume is otherwise to be broken and opened.

Chap. 12. *Of the Tumor* Parotis.

UNto the Inflammations of the Glandules appertaineth likewise *Parotis*, a Tumor so called from the Greek words *Para* and *otos*, because its scituation is nigh unto the Ears. *Hippocrates* in the sixth of his Epidemicks, Comment. fifth, Title first, and elswhere, terms these Tumors *Eparmata*. For a *Parotis* is an Inflammation of the Glandules neer unto the Ears.

The Causes.

Whereas then that a *Parotis* is an Inflammation, it must necessarily follow that the neereft and containing cause thereof is the blood. But this blood notwithstanding is very seldom pure, but most an end Choler, Phlegm, or Melancholy, yea, oftentimes

oftentimes also there are malignant and pestilential humors therewith mingled; from whence it is, that there are malignant and pestilent *Parotides* proceeding therefrom. And it is a most rare thing that blood that is faulty in nothing but that there is too great store thereof should stir up and provoke Nature so far forth that it should attempt such a kind of excretion or separation; but it happeneth from the vitious and depraved Humors, by which Nature being irritated and stirred up is wont to thrust forth unto the external parts such like Humors together with the blood. For like as in critical bleedings (which Physitians usually term *Hæmorrhages*) it is not the blood alone that is principally faulty and peccant, but likewise the vitious humors; the which when that Nature cannot easily expel without the blood, she thereupon assays and instituates this Excretion, or (as we commonly term it) separation of the blood: and this she doth in such a manner (to the end that she may avert and turn away the vitious humors from the principal unto the more ignoble parts) that she makes use of the blood, like as of a Vehicle or Conduit pipe. Now these humors are transmitted and sent either from the whol body, or at least from the Brain. And in good truth we have discovered that these kind of Tumors which we cal *Parotides* may not only happen from vitious Humors bred in the body; but also from poysons that shal by any accident be drunk or taken into the body; as (for instance) I remember the like done here at *Wittenberg*. For a certain Servant Maid (when she was to boyl fish) unwillingly drawing water out of Vessels into which a Bat or Dormouse had accidentally fallen, and was therein suffocated and choaked by the water, and boyling the fish therein; there were (if my memory fail me not) ten Students that together with their Hostess fel sick; and some of them died. And for those of them that recovered (in two of them at least) even these *Parotides* brake forth behind the Ears.

The Differences.

The principal Differences of these *Parotides* are taken from the matter, and from the manner of their Generation. From the matter, because that the blood which exciteth the *Parotis* is either Cholerick, or Phlegmatick, or Melancholick, or in regard also that it hath malignant and pestilent humors mingled together with them. From the manner of their beginning or generation, in regard that some of them have their original without Feavers, or (as *Celsus* speaks in his sixth Book, and Chap. 16.) some of them in good and perfect health, Nature thrusting forth unto those places some certain vitious humors either from out the whol body in general, or else more particularly and principally from the head: but then others of them appear upon Feavers; and those again such as are either long, or acute; and lastly, such as are either benign and inoffensive, or otherwise malignant and pestilential. And this happeneth in the state or declination thereof, Nature by the *Crisis* driving forth the digested humor (the cause of the Feaver) unto these more ignoble places; or else they arise symptomatically in the very beginning or augmentation of Feavers.

Signs Diagnostick.

These *Parotides* are known from the place affected, from the swelling, the pain, and for the most part from the redness that appeareth behind the Ears. But then what kind of Humor it is that is mingled with the blood is known out of the several signs of the Humors that have been elsewhere propounded. If there be present a malignant or pestilential humor, then there is evermore conjoyned therewith a Feaver of the like Nature. If it be only transmitted from the Head, then there are not present any signs of a Cacochymy throughout the whol body; and there went before a pain of the head, the which upon the breaking forth of the *Parotis* either altogether vanisheth, or at least is in great part diminished. Now whether the eruption or breaking forth of it be critical or symptomatical, the time of the Disease, and the signs of the *Crisis* (whether they be present or absent) wil sufficiently instruct us.

Prognosticks.

1. These *Parotides* that have their being without a Feaver are less malignant, and have less of danger in them than those that have a Feaver to accompany them.

2. They also are less dangerous which follow upon Feavers of a long duration, than those that ensue upon acute Feavers; and especially if they be malignant and pestilential.

3. Those of them likewise that break forth critically are more safe and hopeful, more easily cured, and such as free the sick persons from danger. But as for those of them that happen in the end of the disease, after other evacuations, without any remission or abatement of the symptoms, and together with a great debility of the Natural powers and strength of the body, these are very dangerous and pernitious.

4. As for those of them that break forth and shew themselves symptomatically, and have their original from crude and extreamly opposite and (as I may so say) rebellious matter, these evermore prove to be pertinacious, *i.e.* resisting all good means that shal be used; and they alwaies make much work and business both for Nature and the experienced Physitian; and withal they cast the Patient into an extream hazard, and the greatest dangers that may be. For why? they are in a place very nigh unto the Brain, from the which both humors and vapors may easily be

communicated unto the Brain, and to its Membranes; from whence an Inflammation of those parts, and dotage or madness may be excited.

5. Those *Parotides* which being bred at the very instant of the *Crisis* shal not be suppurated, but before ever they are suppurated shal vanish, they wil return, get growth, and so become to be judged of according to the manner, and upon the account of their return; even as are the returns of Feavers into the like circuit. But there may notwithstanding be some kind of hope left, that some Impostumes may arise in the very Joynts themselves. Thus *Hippocrates* in the sixth of his Epidem. Comment. 4. text. 1.

The Cure.

In the Cure of the *Parotides*, we ought in the first place wel to consider, whether they be critical or symptomatical; and what kind of Humor it is that they are bred of, and from which they proceed. If the *Parotis* break forth critically, and so the disease from thenceforth be quite taken away, or at least diminished; then the whol work is to be committed to Nature (according to the Precept of *Hippocrates* in his first Book, and the twentieth Aphorism) and nothing else is then to be done, but only that those things that mitigate pain (as they have been already propounded in the Chapter of an Inflammation) be laid thereupon; the which may likewise at one and the same instant together help forward the suppuration. But then it must not be forgotten that in the *Parotides*, whether they be critical or symptomatical; whether the matter be much or little; and whether it be benign or malignant; that however it be, yet Repellers or drivers back have no place at al (as *Galen* teacheth us in his third Book of the Composition of Medicaments according to the place affected, and second Chapter) lest that the matter be driven back from the more ignoble part unto that which is more noble, and especially the Brain that lieth so neer thereunto. Yea moreover, if the Tumor break not forth sufficiently, and the humor (that by reason of the disease fals and settles it self in the affected part) be not by the vigor of Nature in a sufficient abundance thrust forth; then in this case the gentler sort of Attractives (such as are, the Oyl of Camomile, of Flower-de-luce, of Dill, and of Melilote) are to be made use of. But then the stronger sort of them are not to be administred but with an especial care and caution; lest that the pain should be encreased, and the Natural powers and strength dejected.

After this we are to take notice, whether or no Nature attempt any resolution and discussion; for which purpose she is to be assisted and furthered by discussive Medicaments; or else, whether (which indeed is alwaies far more commodious) it tends toward a suppuration; and in this case likewise Nature her self is to be aided and holpen forward by those Medicaments that promote concoction and digestion of the crude matter. Now the Medicaments of either sort are before propounded (in Chap. 5.) where we treated of an Inflammation, and in the eighth Chapter where we discoursed concerning *Bubo*.

The suppuration being made and past, the Impostume is then to be opened, and (as we have already in its proper place declared) so to be cured.

In the *Parotides* that are Symptomatical Natures endeavor (where it fals short) is to be furthered and promoted; and the overgreat abundance of the antecedent cause (if any such thing be present) is to be lessened and abated. For if that there be present either an abundant store of blood, or else of vitious and naughty humors, we are not to fear that hereby Nature may be averted from, and hindred in her work of expulsion; but rather to expect that being eased of some part of her burden she will afterwards the more easily expel that which remains and ought to be emptied forth.

If yet notwithstanding (an evacuation of the antecedent cause preceding) she be not as yet able as she ought sufficiently to expel; then the expulsion is to be forwarded and holpen on by the application of Cupping-glasses, and other attractives.

And hence it is, that either a discussion of the matter, or (which indeed we usually practise, as most requisite) the conversion thereof into *Pus* or matter is to be procured by those or such like Medicaments as are propounded in the eighth Chapter where we treated of the *Bubo* Tumor. And yet notwithstanding here in this case the condition of the matter is to be heedfully regarded; so that if it be more than ordinarily cold and thick the Discussers that we use are to be proportionably hotter and stronger; and if there be any cause to fear that the matter may be hardened, Emollients are likewise to be made use of.

After the softening of the matter, as aforesaid, (albeit otherwise the matter tend likewise thereunto) a suppuration is by all means to be promoted and furthered, the Impostume to be opened; and as we have already often declared, in this manner the Cure is to be effected.

Neither is it to be expected that this Tumor should be broken of its own accord, nor are we to wait til then, forasmuch as the *Pus* being long reteined is oftentimes wont to produce many sad and dangerous symptoms. And *Gulielmus Fabricius* in his second Century, Observ. 39. relateth that he had observed, that in a certain yong Maiden (while she was afflicted with the *Parotis* we are now speaking of, and yet notwithstanding was not so far amiss and ill as to take her bed, being all the while free from any Feaver) much about the fourteenth day of the Disease an Impostume likewise to the bigness of ones fist appeared forth

forth; the which said Impostume being not timely opened, the Girl thereupon was suddenly surprized with a Feaver, Swooning fits, Vomitings, and Qualms, together with the loss of rest and sleep, and miserably afflicted with a pain in her Back and Reins; and albeit the Impostume was afterward of its own accord broken, yet notwithstanding in regard that very little or no *Pus* at all flowed forth, but rather sought its way and passage downward, it was not long ere it cost her her life.

Chap. 13. *Of a Carbuncle.*

A Carbuncle hath very neer alliance with, and thereupon is by the most reckoned up and in order placed next after an Inflammation; as a Tumor that hath its original from Blood over hot, burnt, and corrupted. But now this same Tumor hath divers Names or Appellations. By the *Grecians* it is termed *Anthrax*; by the Latines, *Carbo* and *Carbunculus*: *Avicen* cals it *Pruna*, and *Ignis Persicus*, or the Persian fire. By which several words & names although some there be who conceive that several and different Tumors are signified, and thereby to be understood; and thereupon have treated of *Pruna* and *Ignis Persicus* in peculiar and distinct Chapters; and likewise have handled the Carbuncle and *Anthrax* as distinct from them, and also as differing each from the other; yet notwithstanding the very Truth is, that by all those aforesaid appellations one only kind of Tumor is signified; for that which with the Greeks is *Anthrax* with the Latines is *Carbunculus*, a Carbuncle, or Fire-coal. Unless any one will make this distinction out of *Avicen*, that what beginneth without pustules and humidity is a Carbuncle or *Pruna*; but that which beginneth with pustules, and bladders, and that likewise hath a moisture flowing out of it, this may be called *Ignis Persicus*.

Now this Swelling is called by this name, in regard that it hath over it a certain Crustiness that is black like a Coal; for which cause it is also termed *Pruna*, because the Flesh is black, and as it were burnt with a Coal; and moreover it is said to be a Fire, in regard that the parts are burnt as by a Fire. But in truth, that which *Celsus* and *Pliny* have left written touching a Carbuncle seems yet scarcely in al things to answer to a Carbuncle in general, but only to some one species thereof; and haply unto a kind therof that is Epidemical, and to a new Disease. For *Celsus* in his fifth Book, Chap. 28 thus writeth: *From those that befall extrinsecally we must now come unto such things as are internally bred, some one part or other of their Bodies being corrupted. Among which there is none worse than a Carbuncle: of this Carbuncle there are these Notes and Marks; there is a certain redness, and upon it there stand and hang out (but not very far) certain Pushes or Pustules, especially such as are black, and somtimes black and blewish or Lead-color'd, or Pale. In these there seems to be a rottenness and filth; beneath the colour is black: the Body it self is dry, and more hard than it ought to be. About the which said Carbuncle there is as it were a Crust, and this is surrounded by an Inflammation, neither can the Skin in that place be possibly lift up, but it is as it were fixed and close fastned unto the Flesh underneath it. The sick Person is extream sleepy; and somtimes there ariseth a certain kind of horror, or else a Feaver, or both. And this Evil creepeth along, there being drawn out as it were certain roots, somtimes more speedily, and somtimes more slowly: and likewise above when it first proceedeth forth it looketh of a whitish colour, and then instantly it becometh Lead-coloured; and about it there arise little Pushes or Pustules. And if it happen to light upon the part neer the Stomack, and the Jaws, it then oftentimes suddenly stoppeth the Breath:* thus far *Celsus*. But now *Pliny* (in his Book 26. Chap. 1. in which he treateth of Diseases that were new and unknown in all former ages) thus writeth: *It is recorded in the Annals that the Carbuncle (the peculiar Malady of the Province of* Narbone) *came first into* Italy, L. Paulus *and* Q. Marcius *being Censors: of which the same yeer two that had been Consuls (*Julius Rufus, *and* Q. Lecanius Basilus) *died; the former of them through the unskilfulnes of the Physitians being cut; & the latter, he himself having put a Needle into the Thumb of his left Hand which being drawn forth the Wound was so smal that it was scarcely to be discerned. It is bred in the most occult and hidden parts of the* Body, *and for the most part under the Tongue; it hath a reddish hardness (like unto the Varix or crooked Vein) but black in the head of it, & elsewhere blewish or Lead-coloured, distending the* Body, *yet not swelling up, without pain, without itching, without any other sign or token (whereby it may be known) then an extraordinary propension to sleep; and those that have been surprized herewith, it hath taken them away in three daies time; and sometimes bringing along with it a certain horror; it hath round about it smal Pustules, but very seldom is there any Feaver attending it; and when it invadeth the Stomack and the Jaws, it soon killeth.* Thus *Pliny*. Now whosoever shall well weigh what he hath written shall easily perceive that he here describeth some other Disease, or at the least a Disease that hath in it some thing peculiar and differing from the ordinary Carbuncle, and ending in a Gangrene and Sphacelus.

Pliny Expressly referreth it unto Diseases new and never known before, and writeth likewise that they arise in the most hidden parts of the Body, and for the most part under the Tongue; that it is without pain, without itching, without any other symptoms then sleep; with which such as are surprized are deprived of life in three daies

time

time, no swelling at all appearing. But now *Celsus* writes, that it sometimes ariseth also without a Feaver, and that it befalleth those parts that are about the Stomack and the Jaws: whereas the ordinary and common Carbuncles arise in the outward parts of the Body, and have a grievous pain joyned therewithall; they likewise invade the Party with a Feaver, and the place affected hath likewise accompanying it a manifest Swelling.

What a Carbuncle is.

But that we may again return unto the Carbuncle that is commonly known among Tumors or Swellings; it is *a Swelling that hath its original from a most fervent and adust blood that corrupteth the part.*

The Causes.

The Conteining Cause of a Carbuncle (according to the assertion even of *Galen* himself, in his Book of Tumors, Chap. 6. and in his second to *Glauco*, Chap. 1. and his 14. of the Method of Physick, Chap. 10.) is a blood fervently hot, and thick, which (in his Book of black Choler, Chap. 4, and 5.) he affirmeth to be black Choler. To wit (as we may gather out of his second Book of the Differences of Feavers, Chap. 19.) a Carbuncle ariseth from a fervent thick Blood, putrifying, and degenerating into the Nature of black Choler, or having black Choler mingled with it, and for the most part a certain malignity conjoyned therewithal. This Swelling although it may be generated in the Body by little and little, and by degrees assume this ill and depraved Nature; yet notwithstanding when it hath gotten any degree of the said pravity and malignity, it is then by Nature instantly and suddenly driven forth from the interior unto the exterior parts, that is to say, from the more noble members unto those that are less noble and worthy. Which likewise happeneth when the Blood is infected and corrupted by reason of some external Corruption; from whence it is, that a Carbuncle is never excited by the Congestion or heaping up of blood; but is evermore generated by a defluxion that is all at once made: and thereupon it is deservedly accounted among Inflammations, and is said to be very neer neighbouring unto a *Phlegmone* or *Inflammation*. Neither is it only generated of black Choler, like as a Cancer, but it is bred by adust and burnt blood, degenerating into black Choler, or else having black Choler mingled therwith.

Now the aforesaid adust blood is generated from an ill and unwholsom course of Diet, and from meats of a depraved and vitious quality affording and supplying the whol matter of all the blood. And this is likewise much more promoted and furthered by the external Constitution of the Air, overheating, burning, and corrupting the humors, and especially its occult and malignant Constitution depraving the humors: and indeed there is hardly any Carbuncle to be found that is altogether void of, and free from malignity.

The Differences.

Yet notwithstanding in regard that this Malignity is sometimes greater, and sometimes less, and that some Carbuncles invade very many in a Pestilent constitution of the Air, and others again here and there seiz upon the sick without any such pestilent constitution of the Air; Carbuncles therefore are to be distinguished into Pestilent, and not Pestilent. Moreover some of them arise with a Pustule, or with such Pushes as are caused and raised by the fire, which if they be broken, there lieth underneath within a Crusty Ulcer (and this happeneth if not alwaies, yet for the most part) and such as these are in special by *Avicen* called *Pruna*, or *Ignis Persicus*: Others of them arise and appear without Pustules.

Signs Diagnostick.

The Carbuncle beginneth (as hath been said) for the most part from a smal Pustule; but sometimes there is not only one of the greater Pustules breaking forth, but likewise many smal ones, like Millet seeds, rising and appearing very thick in the particle; which when they are broken, the Ulcer becometh crusty, such as is excited by a red-hot Iron. But before these Pustules break forth there is a certain itching felt in the part, and thereby there is one or more Pustules arising and appearing: yet notwithstanding the Carbuncle sometimes beginneth without any manner of Pustule, and a crusty Ulcer is excited, the crustiness being one while somwhat blackish, another while having in it the resemblance of the color of Ashes; and then again in a very short space after it groweth forth, and becometh like unto Bubo's, after a round acute figure, with an extraordinary great heat, burning and pain; al which are especially exalperated about the Evening; and then they so vex the sick party that he can hardly withhold his hands, but that he must be rubbing of the part; from which rubbing there afterward arise very many of the aforesaid Pustules. The flesh that lieth round about them waxeth hot, and hath in it at the heighth an extream great and burning heat; it likewise obtaineth a color somwhat blacker than is that in an Erysipelas and a Phlegmone, like as if there were something of black choler mingled together with the red. There happen moreover other Symptoms besides the former, to wit, a Feaver, which (as *Galen* also testifieth in his fourteenth Book of the Method of Physick, Chap. 10.) infesteth those that are surprized with a Carbuncle, more than those that are affected with a Phlegmone or Erysipelas; a nauseousness likewise, a vomiting, a dejection of the Appetite, a trembling with a panting and beating of the heart, frequent

frequent faintings and ſwoundings, dotage; all which ſaid ſymptoms do ſo much the more afflict and grieve the party, by how much the matter is the more malignant.

For there is a certain difference even of thoſe Carbuncles themſelves, not only in regard that with the aforeſaid aduſt blood (which is the conjunct cauſe of the Carbuncle) there is ſometimes this, another while that humor mingled; but more eſpecially, in that one Carbuncle is Peſtilent, and another not Peſtilent. For albeit every Carbuncle be malignant, by reaſon of the hot Matter, being aduſt and putrefying (which hath in it a power and quality to corrupt the fleſh, and cannot wel return into any more benign or better nature; neither may it wel be ſuppurated:) yet notwithſtanding every of them is not Peſtilent; neither hath every of them any adventitious Malignity, but ſometimes only beſides the Native malignity of the Carbuncle there chanceth likewiſe another kind of malignity from the common ſtate, or the contagion of the Air. But now a Peſtilent Carbuncle is diſcerned from that that is not Peſtilent, firſt of al by the preſent Peſtilent conſtitution of the Air. For it is hardly poſſible that a Carbuncle ſhould ariſe at ſuch time as the ſaid Peſtilent Conſtitution is predominant, which in it ſelf ſhould not be Peſtilent. Moreover al the ſymptoms and ſigns that appear in the Carbuncle are both more frequent, and more grievous in a Peſtilent Carbuncle, than in a Carbuncle that is not peſtilent. For even the Feaver alſo which is adjoyned unto the Carbuncle reſembleth and carrieth along with it a Peſtilent nature; and although it ſeem outwardly to be more moderate and gentle than that which appeareth in the Carbuncle that is not Peſtilent (yea, ſometimes ſo that it can hardly be perceived) yet notwithſtanding at that very time it the more burneth the inward parts, and is by far the more dangerous: the freſh color of the face is changed, the tongue becometh black, and is dry; the excrements of the Belly are liquid and cholerick, the appetite is dejected; there is likewiſe preſent a nauſeouſneſs, and a vomiting of the moſt offenſive and the worſt humors; a difficulty of breathing, a ſtinking breath; and there is alſo much ſweat, and this is either ſomwhat hot, or elſe (as we term it) a cold ſwear. The ſleep is ſometimes very ſound, and ſometimes watchings infeſt the ſick party; dotings alſo accompany the ſame, as likewiſe faintings and ſwooning fits. And hereupon it is that there is more danger threatned by one Carbuncle, than there is by another. For although every Carbuncle be not pernicious; yet notwithſtanding (as *Galen* teſtifieth in the 3. of his Epidem. Comment. 3. tit. 2.) the moſt pernicious of al is the Peſtilent, or that which beſides its own proper and particular malignity hath alſo adjoyned with it that which the conſtitution of the Air bringeth along with it, and which is attended with all thoſe pernicious ſymptoms: which if they remit very much of their former intenſneſs and vigor, there is then left remaining ſome hope of ſafety and recovery; but if from day to day they are heightened and become more vehement, there is then no ſafety or hopes of eſcape to be expected.

The Prognoſticks.

1. By how much the blacker the Carbuncle is, by ſo much the worſe is it, as being ſuch as is produced by the moſt corrupt blood. The next unto this is the wan and yellowiſh. Thoſe that are leſs malignant, and conſequently the leſs to be feared, are ſuch as have in them a reddiſh color; to wit, ſuch in which the blood hath not as yet altogether loſt and changed its Nature, but that it hath as yet retained ſomwhat of its native heat and color.

2. Thoſe Carbuncles likewiſe that are ſmal are leſs pernicious than thoſe that are great; and from a very little Puſtule they ſuddenly acquire and get an extraordinary greatneſs.

3. And ſo are likewiſe thoſe that are alone, than ſuch as have other Carbuncles conjoyned with them.

4. Of al other thoſe are moſt deſtructive and deadly, which after they have once begun to wax red do immediatly vaniſh again. For the matter being transferred unto the more inward parts often (if not evermore) proveth deſtructive and deadly.

5. There are ſome alſo who conceive that this is likewiſe throughly to be conſidered, to wit, Whether the Peſtilent Carbuncle ariſe before the Feaver, or elſe whether or no the Peſtilent Feaver going before it at length break forth. For they conceive that the Carbuncle that breaketh forth before a Peſtilent Feaver is more ſafe (provided that no Symptoms follow thereupon) in regard it is an evidence that Nature is ſtrong, and able to expel the Peſtilent Poyſon before the Feaver, ere ever it can ſeize and ſurprize the heart. And (on the other ſide) that to be more dangerous which at length breaketh forth after a Peſtilent Feaver, foraſmuch as (the Heart being ſeized upon) it hath its original from the poyſon and the corrupt humors now diffuſing themſelves into al parts of the body.

6. The place alſo manifeſteth when the danger is more or leſs to be feared. For thoſe are evermore accounted evil and pernicious that ſtick faſt in the Emunctories, and neer unto the Noble and Principal Members. But here moſt eſpecially the ſtrength and natural powers are to be regarded; and we are wel to conſider whether they be ſtrong, or elſe but weak. For that ſtrength that is but weak and languiſhing may be ſoon overpowered and vanquiſhed even by a ſmal Diſeaſe. Whereas (on the contrary) that that is more vigorous oftentimes overcometh and maſtereth even

that

that disease that in it self is strong and powerful.

The Indications.

The Indications in a Pestilent Carbuncle are different from those in a Carbuncle not pestilent. In a Pestilent *Carbo* or Carbuncle the fervent heat of the blood is wholly al the body over to be restrained; and withal, the Heart at the same time is to be fortified against that malignity, which (as we have said) is here very seldom absent. The rest of the Cure is to be directed unto the Carbuncle it self. But now in a Pestilent Carbuncle there is a more poysonous and pestilent quality appearing than in the fervent heat of the blood; yet neither is this to be sleighted or neglected.

The Cure.

And therefore (as to what belongeth unto the Cure of a Carbuncle) there are two things that we are especially to regard and have an eye unto; the Antecedent Cause, or the fervent and corrupt blood that is in the whol body; and the Conjunct Cause, or that same Humor that now exciteth the Carbuncle. A convenient Diet therefore being ordained, and a moderation observed in those things we cal not natural, the extream fervent heat of the blood is by opening a Vein to be taken away. And yet this Venesection is not rashly to be made use of in al manner of Carbuncles; but if it hath any place at al, it is most chiefly in that that is not pestilent; touching which likewise that assertion of *Galen* (in his fourteenth Book of the Method of Physick) and of other Authors (who conceive that the blood is to be drawn forth even until the sick person faint and swoon) is to be understood. But in a pestilent Carbuncle nothing is rashly to be attempted, that may weaken and deject the Natural powers, (of which there ought to be the most special regard had in the plague, and in pestilent Feavers) amongst the which Venesection unto fainting and swounding is not the last (but rather the first) which together with the Spirits evacuateth that humor that is most agreeable and friendly to Nature, and even that most excellent and precious Treasury of the life. Nay indeed moreover, even somtimes when the pestilent Carbuncle is just then breaking forth, we cannot safely enough institute and ordain Phlebotomy. For whereas the Carbuncle somtimes breaketh forth, not instantly upon the very first invasion of the Plague, and pestilential Feavers, but often afterward on the fourth daies (or haply on some other daies) the Natural powers wil not then bear the said Venesection, in regard that they are now dejected by the disease, and have therefore entered the Lists, & are now conflicting with the said disease. But now what Veins are to be opened, sufficiently appeareth from that which we have spoken above, touching the evacuation of the blood, & touching Revulsion, and Derivation, in the Cure of an Inflammation. This only is here to be observed, that we must beware, lest that whilst we evacuate the blood, we do not lead and draw the same either unto any noble Member, or else through any noble Member, lest that the said Member should be affected with its malignity.

And therefore we say that that Vein is to be opened, by means whereof the blood may rather be drawn toward the part affected than drawn back from it. Wherefore if the Carbuncle shal be about the Head, or the Arm-holes, or in the Breast, the neerest Vein in the Arm of the same side is then to be opened. But if it be below the Liver, then the Ankle Vein, or the Ham Vein of the same side. And this Phlebotomy ought to be put in practice instantly, and in the very beginning, before the Feaver get strength, and the Natural vigor be too much dejected.

But now in regard that by this blood-letting the naughty corrupt humors can scarcely be evacuated, therefore some conceive that there is need of purgation, by which the said depraved humors may be evacuated, lest otherwise the Native heat should be suffocated and extinguished by them; and that Nature may afterward the more rightly moderate the expulsion; and that so the part affected may not be corrupted by the great abundance of the Humor flowing thereto.

But then we ought to be extraordinary careful, lest that by the purging Medicament, the Humor that Nature endeavoreth to thrust forth unto the external parts be drawn unto the internal: and this is most of al to be feared in a pestilent Carbuncle. We conceive indeed that it may more safely be ordained and appointed in a Carbuncle that is not malignant. But when a Feaver is therewith joyned (and that an acute one) the crudity of the matter then for the most part forbids it; and to speak truth, there is hardly a Carbuncle to be found in which there is not somthing of malignity; and therefore the malignant matter is with more safety thrust forth unto the superficies of the body by those Medicaments we term *Alexipharmaca*, then drawn to the more inward parts by Medicaments that purge.

That fervent heat also of the adust blood is to be altered; and the malignity to be opposed by convenient Medicaments, as the juyce of Citron, of Pomegranates, Sorrel, Borrage, Bugloss, Water Germander, Succory, and the like; with which (in a pestilent Carbuncle) other Alexipharmaca may also be fitly mingled. As,

Take *Conserve of Sorrel, Borrage, Bugloss, of each one ounce and half; the species of Diamargarit. frigid. Confection of Hyacynth, Elect. de Gem. of each half a dram; of candied Citron rind six drams; the candied roots of Scorzonera (or Vipers Grass) half an ounce; with the juyce of Citron make an Electuary.*

Unto

Unto which (in a Peſtilent Carbuncle) we may add Bole-armenick, *Terra Sigillata* or ſealed Earth, Harts horn, Bezoar ſtone, and the like. Very many there be that in a Carbuncle do much commend *Scabious*, and they conceive that it never ought to be paſſed by; and they write, that either the Juyce, or the Water, or the Decoction thereof, is of ſingular uſe and benefit in a Carbuncle.

It wil not likewiſe be amiſs to fence and guard the Heart with Topicks, by Epithems that are otherwiſe known, applied to the Region of the Heart and the Pulſes; that ſo by all manner of means the Heart may be preſerved ſafe and ſound from all the malignity.

Afterward (as for what concerns the conjunct cauſe, or the Tumor it ſelf) the way and means of curing a Carbuncle is not altogether the ſame as in other Inflammations, unleſs haply there appear to be in it very little of an offenſive quality. Neither muſt we make uſe of Repellers (but the malignant and poyſonous matter is rather to be attracted from the more inward unto the external parts) unleſs perhaps they may be adminiſtred for the mitigating of the vehemency of the pain; touching which more hereafter. And therefore ſo ſoon as Veneſection hath been adminiſtred, the part affected is forthwith to be ſcarified, and that likewiſe with lancings that go deep enough, that ſo the corrupt, malignant, and poyſonous blood (which unleſs it be inſtantly emptied forth of the part affected corrupteth the parts neer adjoyning) may be quite drawn forth. Immediately upon this the part affected is to be cleanſed and throughly waſhed with warm ſalt water, or with ſome other convenient liquor, leſt that the blood ſhould clod, and ſo grow together in the part. Now if the corrupt blood ſeem not as yet to be ſufficiently evacuated, the ſcarifications ought then to be repeated. We are likewſe allowed (when the place is ſcarified) to apply thereto Cupping-glaſſes or Leeches. Yet notwithſtanding if with great violence the humor flow unto the part, then Attractives may not ſafely enough be adminiſtred, ſince there is cauſe to fear, leſt that the matter flowing thereto in great abundance, the pain ſhould be made the more vehement; which may (poſſibly) excite and cauſe watchings, augment the Feaver, and deject the Natural vigor; but rather, if the matter flow thereunto over haſtily, and with too great force, we are then to make uſe of thoſe Medicaments which by moderate repreſſing and driving back may likewiſe digeſt. And ſuch is the following Cataplaſm:

Take *Arnogloſs* (we commonly term it Lambs-tongue, or Way-bread) *Lentiles, Bread that is neither wholly purged from its bran, neither yet ſuch as is altogether branny, of all theſe a like proportion; let them boyl in Water or Wine, and ſo make a Cataplaſm*: which is to be applied twice or thrice every day.

But now this ſaid Medicament that we have mentioned, or ſuch like, is not to be impoſed and laid upon the very Carbuncle it ſelf, but only neer about it, ſome three fingers diſtance from it. For by this means the malignant matter it ſelf is not driven back, but only the extream heat and pain is mitigated, the flux of matter is ſomwhat retarded; and hereby is prevented the retreating back again of the matter unto the more inward parts. But yet neither muſt this be paſſed over in ſilence, that it is not evermore requiſite to fence the Carbuncle with ſuch a guard: but notwithſtanding, this for the moſt part is neceſſary, to wit, That that part which hath a neer relation with a noble Member ſhould be wel guarded; forasmuch as it is no way hurtful (but indeed profitable) that ſome of the matter ſhould be derived and evaporated unto the other ignoble parts.

Moreover, the place being ſcarified, there are not to be applied thoſe Medicaments that otherwiſe are wont to be laid on (in regard that they promote and further the *Pus* or purulent matter, and by this means may encreaſe the putrefaction and rottenneſs; ſince that a Carbuncle in putrefying evermore creepeth and ſpreadeth ſo that very often a Mortification chanceth unto ſuch parts; but rather thoſe Medicaments that are drying, and ſuch as reſiſt putrefaction. For which end and purpoſe we may adminiſter the Paſtils, or Pomanders, of *Andro*, *Muſa*, *Polyidas*, and *Paſio*; which are to be diſſolved firſt of al in Wine, and then alſo afterward in Vinegar; touching which ſee *Galen* in his Compoſition of Medicaments in general, the fifth Book, Chap. 11, and 12. They commonly likewiſe make uſe of the Ægyptiack Unguent. There may alſo be made a Cataplaſm of the Meal of the Pulſe Orobus with Oxymel. *Morſus Diaboli* or Devils-bit is likewiſe very much commended; if while it is yet green and wel bruiſed it be laid on; or elſe boyled in Wine and drunk. There be many likewiſe that here make uſe of thoſe things that are experimentally found to be helpful by the propriety of their ſubſtance; among which *Scabious* is eſpecially commended, as alſo *Morſus Diaboli* or Devils-bit; they take (to wit) the *Scabious* whileſt it is green, and bruiſe it wel, and then they add thereto the Yelk of an Egg, Hogs greaſe that is old, and a little Salt; and herewith they make a Cataplaſm; which is often to be renewed. Some likewiſe take the Herb Comfry for the ſame uſe, and with it they prepare and make ſuch a Medicament as this that followeth:

Take *of the Juyce of the greater Symphytum (or great Comfrey) Scabious, Cranes-bill (or Doves-foot) of each one ounce: of Barley Meal two ounces and an half; and mingle them for a Cataplaſm.*

Others there are who (if there be preſent an extream heat and pain) commend this, Viz.

Take *Plantane Leaves, and Sorrel Leaves,*

of each two handfuls, boyl them to a softneß; then let them be bruiſed; when they are throughly bruiſed, add to them the Yelks of four Eggs, Treacle two drams, Barley meal a ſufficient proportion, and ſo make a Cataplaſm.

Many likewiſe there are that commend thoſe Wallnuts that are old and Oyly, being bruiſed; of the which ſome make ſuch a Cataplaſm as this that followeth.

Take *the Kernels of Walnuts (ſuch as are old, and rancid or mouldy) in number three; dried Figs, and Raiſins, an equal proportion; boyl them in ſtrong white Wine to a ſoftneß, and then bruiſe them; adding thereto a dram of Salt, and two Yelks of Eggs; mingle, and then make a Cataplaſm of them.*

But now if there be any that wil not endure Scarification; or if otherwiſe the Carbuncle wil not yeild unto theſe Medicaments; and it be ſo, that the corruption, the blackneſs, and the ſigns ſeem alwaies to be augmented; we muſt in this caſe have recourſe unto Cauteries; and that inſtantly and with all poſſible ſpeed, for even the leaſt delay may caſt the ſick Perſon into an extream peril, yea into the greateſt danger even of death it ſelf. But here Potential Cauteries may not ſo ſafely be adminiſtred; in regard that the Cruſt which is drawn over them fals off more; and ſo the exhalation of the corrupt and malignant humor is hardened. The actual is therefore by moſt accounted the ſafer. For why, the Actual Cautery, by the heat and drineſs of the Fire, doth eſpecially reſiſt putrefaction, and preſerveth the ſound parts, leſt that they alſo ſhould be infected with putridneſs; and it likewiſe attracteth from the depth and the very bottom all the malignant and corrupt Matter; and for this cauſe it is here by the moſt commended as the moſt effectual Remedy; who conceive that here (in this caſe) this is not ſo grievous a Remedy, ſeeing that the ſick Perſon is hardly ſenſible of it, in regard that the Fleſh is dead; and becauſe that the uſe of it muſt be ſo long continued, even until in all parts thereof there be a ſenſe of pain. Yet notwithſtanding even the Actuall Cautery hath alſo in it this diſcommodity, that it induceth and cauſeth a Cruſt or Eſchar, which it ſelf ſo hindreth that the malignant and poyſonous matter cannot exhale. If therefore any will uſe this Remedy, he muſt be altogether careful, that the Cruſt drawn over it hinder not the exhalation of the corrupt and malignant humor; and therupon he muſt uſe his endeavor, that the Cruſt may ſpeedily (even within the ſpace of twenty four hours) be removed; in regard that there may be danger in the delaying thereof. And indeed (for this purpoſe) they commonly uſe Butter, the Suet or Fat of a Hog, the Fat of a Gooſe, and ſuch like moiſtening and ſuppurating Remedies. But the Truth is, that *Horatius Augenius* and *Gulielmus Fabricius* do rightly inform us, that (in thoſe affects in the which there is otherwiſe ſo extream a danger threatned from putridneſs) theſe Remedies may not with any ſafety at all be adminiſtred; foraſmuch as by their humidity, and Emplaſtick virtue, they do in a wonderfull manner encreaſe the putridneſs, & cauſe that the rottenneſs and corruption of the part creep ſo much the further; and moreover theſe do but very ſlowly take away the Cruſtineſs. And therfore theſe conceive that we ought rather to uſe thoſe Remedies that do greatly cleanſe and dry, reſiſt putrefaction, and break aſſunder thoſe ſmal ſlender fibres by which the Cruſt adhereth unto the part affected. *Galen* (in his ſecond Book to *Glauco*, Chap. 9.) for the taking away of the Cruſt (after burning) in the caſe of a Gangrene, uſeth the Juyce of a Leek with Salt. *Gulielmus Fabricius* for the falling off of the Eſchar, and for the cleanſing of the Ulcer commendeth this following Unguent.

Cauteries.

Take *the meal of* Orobus *(or bitter Vetch) the root of Ariſtolochy, or Birthwort, the Flower-de-luce of Florence, and the leſſer vernal Gentian, of each half an ounce; Treacle two drams, with a ſufficient quantity of Honey of Roſes; and ſo make an Unguent.*

Horatius Augenius commendeth this.

Take *Vitriol two drams, the beſt Honey half an ounce, Hogs greaſe two drams, and mingle them.*

And that the Ancients did not alwaies uſe moyſteners and thoſe Remedies that forward the *Pus* or Purulent matter, for the removal of the Cruſts, is ſufficiently evident out of *Galen* his ſixth Book of the Compoſition of Medicaments according to the place affected, Chap. 6. and *Paulus Ægineta* his fourth Book, and Chap. 19. in the which ſaid place there are many more ſuch like Medicaments to be ſeen.

And as for my own part, I had rather (for the taking away of the Cruſts which for the moſt part the Carbuncle contracteth) uſe ſuch like Remedies, then Cauteries, whether Potential or Actual. For here the Putridneſs is not ſimple, as in a Gangrene, and other corruption of the parts (where that that is putrid is moſt commonly ſeparated from the ſound part; ſo that we may ſafely enough burn away what is corrupt and putrid. But in a Carbuncle there is preſent a malignant humor, and that diffuſed throughout the whole part; and therefore we are to make uſe of thoſe Medicaments that extract, that ſo by this means what is as yet ſound may be preſerved from putridneſs and Corruption. *Ætius* writeth, that wild Rue impoſed in a Cataplaſm with Honey and Raiſins of the Sun, doth likewiſe inſtantly ſeparate the Cruſts of Carbuncles: and therefore even thoſe medicaments alſo that reſiſt malignity (as Treacle and the like) are for the moſt part very properly herewith mingled. And therefore we conceive that the Unguent of *Gulielmus Fabricius*, erewhile mentioned, is exceeding profitable

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in a Carbuncle, not only after the burning, but likewise at all other times. Others compound such a like medicament, which (as they affirm) wil in two daies space separate the good and sound Flesh from the corrupt.

Take *Rue one handful, Leaven one ounce, dry Figs three in number, Pepper a dram, Salt a dram and half; make a Cataplasm which may be applied mornings and evenings.*

In general, in Pestilent Carbuncles, to extract the Poyson we must prevent and hinder the creeping and further spreading of the putridness.

For the taking off the Scar this Emplaster is principally commended.

Take *of the best Treacle, and Mithridate, of each half an ounce, Leaven and Turpentine of each two ounces, Honey of Roses one ounce and half, fresh Butter two ounces, common Salt one ounce, Chimney Soot two ounces and half, Saracen Soap three ounces, Saffron three drams, three Yelks of Eggs, bake them altogether, and make an Emplaster.* Or,

Take *Scabious, the greater Comfrey, of each two ounces, of ful and fat Figs dryed three, an Onion roasted in Embers, Squils half an ounce, Raddish root cut into smal pieces two ounces, two Yelks of Eggs, Salt two ounces, Leaven and Chimney Soot of each one ounce, Honey & Turpentine, of each as much as wil suffice; and so make a Cataplasm: and having spread it upon a Linen Cloath lay it on hot, and let it be shifted almost every hour.*

If now we perceive the Crust to become round and a circular redness appearing, it is then a sign & token of ensuing health and recovery, and a manifest testimony that Nature hath now separated the corrupt from the sound. When the Crust is wholly taken away the Ulcer is then to be throughly cleansed with *Honey of Roses, and the Juyce of Smallage*, and such like. After the cleansing it is to be filled up, joyned together, and at length with a Cicatrice to be shut up. But touching the cure of a Carbuncle, see more in the fourth Book of Feavers, and the fourth Chapter.

Chap. 14. *Of the Tumor* Paronychia.

UNto Inflammations there also belongeth that Tumor that the Greeks call *Paronychia*, because that it is generated in the Confines or sides of the Fingers; the Latines term it *Panaritium*, the Germans *Der Wurm, Oder Das Ungenandte*. For the Vulgar are of Opinion, that in this Tumor there lieth hid a Worm, that by gnawing exciteth and causeth those so great pains; and that when it is mentioned and spoken of it is thereby exasperated, and that therefore it ought not to be so much as named: but these things are meerly fabulous.

What a Paronychia is.

Now a *Paronychia* is a hot Tumor or Swelling, arising from blood adust and atrabiliary in the extream part of the Fingers, at the sides of the Nails; and by reason of the neighborhood of the Nerves exciting most grievous and intollerable pains.

The Causes.

For this Tumor hath its original from adust, and (for the most part, likewise) malignant blood; which Nature thrusteth forth unto the Fingers ends; and there it causeth an Inflammation.

The Signs Diagnostick.

It is known by the Swelling, Redness, and pain, appearing in the Fingers ends about the Nails; together with a most extream and intense pain (by reason that the neer adjoyning Nervous parts are affected) which wil not permit the sick Person to sleep, or take any rest, neither night nor day; and this pain (in regard of the Nerves consent) is oftentimes extended throughout the whol Arm; and it hath to accompany it a continuall Feaver, and somtimes (by reason of the over-great pain) a Lipothymy, which we term fainting or swounding.

Prognosticks.

1. According to the benignity and inoffensiveness of the humor, the malady is somtimes more mild and tollerable, and somtimes again more grievous and intollerable. For if the matter be benign or moderate and favorable, the symptoms are then the less vehement.

2. On the contrary, if the Matter be Malignant, the Malady is dangerous; for it oftentimes so corrupteth the Ligaments and the neighboring Nerves, that the utmost Joynt together with the Bone Impostumateth; and somtimes the whole Finger is corrupted.

The Cure.

The Vulgar, as they have superstitious Opinions touching the Cause, so they have likewise concerning the Cure of this Tumor. For they think that if any one thus affected shall in the Spring time wash and besmear his hands with the Eggs otherwise called the seed or Sperm of Frogs, & shal then suffer them to dry leisurely & of their own accord; and shal afterward hold in this Hand that Finger that is grieved with this Inflammation, he shal by this means assuage and qualifie the said Inflammation. And some there be also that every yeer hold in their hand a live Mole, and then having conceived and mumbled over a certain form of words, with squeezing hard they kill the Mole they have in their hand; and then they brag and boast that for the yeer following they are able to kil and destroy all those Worms.

But, to omit these fopperies, the right and due way of Curing this Evil is then taken, when after the general evacuation of the humors by Blood-letting and Purgation hath been premised, in the first place we impose upon the part affected those things that moderate the pain, and mitigate the fervent heat of the humors, and such Medicaments likewise as help forward and further suppuration.

But Repelling and Astringent Remedies are by no means to be imposed upon the grieved part, lest that by this means the humor should be the more impacted into the part, the pain augmented, and the Nerves and Bone corrupted. If yet notwithstanding the Afflux be over great, then let Repellers be laid on very nigh unto the part next above it.

And therefore in the very beginning the following Cataplasm is to be imposed:

Take *Barley meal, and Bean meal, of each one ounce; Camphire one scruple; the Mucilage of the seed of Fleabane as much as will suffice, Mingle all these with Vinegar over the fire, and so make a Cataplasm.* Or,

Take *the juyce of Nightshade, of Plantane, of Navelwort, of each half an ounce; the Mucilage of Fleabane seed extracted with the Water of Nightshade three drams; Bole armenick half a dram; Camphire five grains; Oyl of Roses, and Myrtle, of each half an ounce: Mingle them, &c.* Or,

Take *the Mucilage of Fleabane seed extracted with the juyce or water of Plantane two ounces; Bole armenick one dram; Vinegar half an ounce: Mingle them, &c.*

Or else let the white of an Egg mingled with the Oyl of Violets be imposed.

There are likewise commended those little Worms that are found in the middle of the utmost rind of the Teazel or Fullers Thistle, if while they are alive they be bound about the Nails affected.

Where the matter tendeth to Suppuration,

Take *the Meal of Fenugreek seed, and Linseed, of each half an ounce; the Yelk of one Egg, fresh Butter one ounce; the fat of a Hen three drams: Mingle them without fire, and make an Unguent.* Or,

Take *the Mucilage of the juyce of Fleabane one ounce; the meal of Linseed and Fenugreek, of each three drams; the Yelk of an Egg; Saffron one scruple; the fat of a Hen, and Butter unsalted, of each one ounce: Mingle them, and make a Cataplasm.*

When the *Pus* is bred, the Impostume is forthwith to be opened, and the *Pus* or Snot-like filth (being seldom good, but rotten and corrupt) is to be drawn forth. The *Pus* being thus evacuated, such a like Abstersive and Incarnative is then to be made use of.

Take *Aloes Hepatick three drams; Myrrh, Frankincense, Sarcocol, of each one dram; pure and cleer Turpentine half an ounce; Honey of Roses two drams; Mingle them, &c.*

Gulielmus Fabricius (in the first Century of his Chirurgical Observations, Observ. 97.) doth not stay to wait for the Inflammation, or for any notable swelling up, and suppuration; but in a Woman that was afflicted with a most grievous pain in the end of her finger, together with a Feaver, a fainting and swounding, a nauseousness and vomiting, and other symptoms; he thus ordaineth his Cure. He first of al a little fomenteth the finger with Cows Milk in which Camomil flowers, Melilot flowers, the seeds of Fenugreek and Quinces were first boyled. And then by little and little he dissected the superficies of the Skin. The Skin being shaven away, there appeared smal red spots; which being cut with the edg of a knife, he findeth under the Skin a drop or two of red Water. That being evacuated, he applied a Linen Cloth dipt and moistened in *Aqua vitæ*, in which there was dissolved a little Treacle. By thus doing he soon qualified and quite took away the pain; and by this one only Remedy the very next day the finger was healed.

And likewise in another Matron, that for three daies together by reason of the vehement pain of the Paronychia could not sleep, nor take any rest at al (the skin being shaven off) he findeth under the skin in the very tip of the finger, a spot of this bigness O, in the which there was contained scarcely one smal drop of the Ichorous excrement. The spot being opened, & thereto applied Cotton dipt in *Aqua vitæ* wherein there was Treacle dissolved, and about the whol hand and wrist a linen cloth (after it had been first wel soaked in vinegar and water) doubled and wrapped, the pain immediately ceased; insomuch that the very next day following the finger was fully and perfectly healed. But the same Author addeth further, that this incision ought forthwith in the very beginning to be made; because that otherwise by the concourse of the Humors there wil be excited an Inflammation and Swelling, and so the flesh lying underneath, yea, and even the bones also wil be in danger of being eaten through. For the Skin in that place is of an extraordinary thickness; so that the matter of the *Paronychia* (which in it self is malignant) when it can by no means exhale, it then acquireth the greater acrimony and poysonfulness; and the finger also, yea, and the whol hand (by reason of the vehemency of pain) is swoln and blown up: and this incision very little or nothing availeth, unless that the matter be first concocted and converted into *Pus*.

Chap. 15. *Of Perniones or Kibes.*

THere is also found a peculiar kind of Inflammation, which they term *Perniones*; the Greeks cal this Affect *Chimethlon* and *Chemeithlon*

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lon (from the Greek word *Cheimon*) in regard of their appearing in the Winter time only. And it is such a kind of Inflammation as in the Winter time ariseth in the heels, and on the toes and fingers. I once likewise saw a Noble-man that had such a kind of Inflammation on the very tip of his Nose.

The Causes.

Now this kind of Inflammation ariseth from the Winters cold, whilest that by it not only the part is weakened and made more apt to receive, but that likewise from the pain there is caused an attraction of blood unto the part.

Yet notwithstanding this is worth consideration, how it cometh to pass that he who hath in the Winter time undergone and suffered some notable cooling of the extream parts should yet notwithstanding be wel, and altogether insensible of it during the Summer, and the Winter following again (and thus to continue for some yeers, and until the Malady be wholly removed and taken away by cure) should be so sensible of an extream itching, pain, and swelling in the part that was over cooled as aforesaid; and that although in the Summer time he felt no ill, instantly in the very first entrance of the Winter the Malady should again get head and return, and an itching be again felt in the part affected: al which argueth that there was some strong impression left behind in the part. For those that are thus greatly cooled do not only suffer a bare alteration; but that there is likewise somthing that is substantial communicated unto the part affected, appeareth even by this, That Apples and Eggs when they are frozen, if they be cast into cold Water, there is then an Ice taken out of them, so that it outwardly sticketh fast unto them like unto a crust, and then these Apples and Eggs return again to their former Natural state; whereas on the contrary, if they be put into warm Water, they become flaggy, turn black, and are corrupted; which notwithstanding could not possibly happen if there were only a meer and simple alteration; and therefore we may conclude, that by the pain that afflicteth the part there is blood attracted to the part affected, that exciteth and causeth the Inflammation.

Signs Diagnostick.

There went before a guarding and preservation of the extream parts of the Body (against the injuries of the external Air) that was but weak and sleight, and not sufficient to maintain a due warmth in them; and thereupon an undue cooling befalleth them; there is likewise an itching and a pain, that is not only once (and after that the sick person hath suffered a refrigeration from the external Air) perceived; but, although it cease in the Summer time and Autumn, yet notwithstanding about the beginning of Winter it again returneth; the part waxeth red, and swelleth up; and now and then also it is exulcerated.

Prognosticks.

This Tumor (to tel you the truth) hath in it no danger at al: yet notwithstanding if the Malady be not speedily cured, it wil prove tedious, and of long continuance, and this pain wil for many yeers be grievous and troublesom unto the Party thus affected; and somtimes likewise the part is wont to be exulcerated.

The Preservation.

Left that the parts should be hurt by the external cold, it is requisite that in the Winter time they should be sufficiently fenced and provided for against the injuries of the aforesaid external cold Air. And more particularly (left that the feet be hurt) it wil be expedient to wear Legharnesses (as they cal them) or linen Socks wel moistened in the Spirit of Wine, especially in that part of them by which they cover the feet. But seeing that it cannot wel be that al the parts should be sufficiently kept from and defended against the cold, yet notwithstanding, left that any one (after he hath for a while been in the cold Air) should suffer any dammage, the refrigerated parts are not first of al to be altered with the contrary quality; but rather we ought to do our endeavor, that the cause which hath insinuated it self into any part may be removed and taken away. And therefore (as it is commonly wont to be done in the cold Septentrional Regions; and of which as of a thing very wel known, *Gulielmus Fabricius* takes notice in his Treatise of a *Gangrene* and *Sphacelus*, Chap. 10) the refrigerated part is not to be put close to the fire, neither are those things that are hot to be imposed thereon; (for if this be done, the coldness, or indeed rather the cold Atomes retained in the part being by this means thrust down into the deeper parts of the place affected, a most intollerable pain happeneth thereupon to arise, yea and somtimes also a Gangrene is produced and excited) but the cooled part is to be wel rubbed with Snow that so by its like the coldness (or cold thing) may be extracted out of the affected part, after the same manner as Apples or Eggs being frozen and cast into the coldest water are restored unto their pristine Nature, the extracted Ice sticking fast without unto the rinds of the one, and shels of the other. And for this very reason the Inhabitants of the abovementioned Northern Regions, when they have been travelling do not accustom themselves to enter into Stoves or Hot-houses, or so much as to draw neer unto any fire, until they have first throughly rubbed their Hands, Nose, and the extream parts (or tips) of their Ears with Snow; or have plunged (as we may so say) their almost frozen feet into cold Water, or

Snow

Snow. And the same *Fabricius* (in the place alleadged) relateth, That a Noble man of good esteem and reputation told him, that when he travelled in those Regions he himself on a time lighted upon one travelling as he was upon the Road; whom finding to be stiff with cold and almost dead he caused to be put into a Cart; and having brought him into an Inne, his Host (the man of the house) immediately plunged him over head and ears, as we say, in cold water; which was no sooner done, but instantly there issued forth from al parts of him a kind of frostiness, in such a manner that his whol body seemed as if it had been al over covered with Ice, like as with an Iron shield: and then he gave him to drink a Cup of Hydromel, putting thereinto the pouder of Cinnamom, Cloves, and Mace; upon which he fel into a sweat in his Bed; and soon after the sick person returned unto his former state, and became perfectly wel recovered.

The Cure.

When now the said congelation is asswaged and qualified, and the cold for the most part extracted and drawn forth, or else hath exhaled of its own accord, (which is known by this, that the pricking pain is much moderated, if not quite ceased) then the part is to be fomented and cherished with sweet Milk made blood warm, in which there have been boyled Rosemary, Organy, Sage, the Leaves of Rue, and Bayberries. It wil be likewise very commodious (this being a remedy that is also very wel known) to thrust deep into warm Water (in which Rape Roots, especially those that were formerly congealed and frozen with col have been boyled) the Hands or the Feet. Or,

Take *White Wine one pint*; *Allum an ounce*; *boyl the Allum with the Wine, and let the part be wel washed therewith: the Decoction also of Lupines is good and helpful: and after it let the part be anointed over with Honey in which live Sulphur hath been boyled.*

This is likewise very efficacious:

Take *of the Oyl of Bayes two ounces*; *Honey one ounce*; *Turpentine half an ounce*: *Mingle, &c.* Or,

Take *Turpentine, unsalted Butter, and Mace, of each alike, and what you please for the proportion: Mingle them, &c.* Or else,

Let the part be anointed with Oyl of Wax.

If the part be already exulcerated, Allum poudered and mingled with a like portion of Frankincense poudered likewise is very helpful, and wel approved of, a little Wine being thereto added: or the Oyl of Roses boyled in a Rape Root (or in the Reddish Root made hollow, and the pith taken al out) and then squeezed and pressed forth.

Or else let an Unguent be made of River Crabs burnt, with Honey and the Oyl of Roses. Or,

Take *Rue, the Marrow of a Bull, the Unguent of Roses, of each as much as you think fit: mingle them, &c.* Or,

Take *Wax, the fat of a Hog, of each an ounce; Litharge of Silver or Lead ten drams; the rind of the Pine two ounces; of Manna thuris one ounce; Oyl of Roses a sufficient quantity. Make an Unguent.*

Chap. 16. *Of the Tumor* Ecchymoma.

THere is likewise somtimes poured forth blood (the Skin continuing stil whol and sound) into the spaces of the parts; from whence there ariseth an Affect, which by the Greeks is termed *Ecchymoma* or *Ecchymosis*, and by the Latines *Effusio*, *Suffusio*, *Sugillatio*. For an *Ecchymosis* is nothing else but *Chymeon ecchysis*, that is, an *Effusion* or pouring forth of the Humors, to wit, the blood, into the next adjoyning spaces, by reason of the opening of the Veins; to wit, if the Skin abiding whol the Veins pour forth that juyce which they contain, that is the blood, as *Galen* speaketh in his second Book of Fractures, Comment. 16. and either the orifices of the Vessels gape (which happeneth in an Anastomosis) or else the blood doth as it were sweat forth and strain it self out through the Tunicles of the Vessels being rarefied; which the Greeks cal *Diapedesis*; or else by contusion the Vessels are loosened; which chanceth if one fal from an high place, or else be oppressed and over laid by the weight of somthing that is heavy lying upon him; or else be smitten and hurt with a club, stone, stump of a Tree; or else lastly, that by some violent motion and extension a Vessel be broken. Then (the Skin remaining whol) the blood is poured forth into the neer adjoyning spaces; whereupon the color of the part is changed; and at first indeed it seemeth reddish; afterward it becometh Leaden colored, then yellowish, green, blackish: whereupon it is that *Galen*, in his Book of Preternatural Tumors, Chap. 10. and tenth Book of the Composition of simple Medicaments, Chap. 9. maketh two species of this *Ecchymosis*; one (which by the general name he calleth *Ecchymoma*) when the part obtaineth a middle color betwixt red and black; which indeed may properly be termed *Pelidna*, that is, of a livid or leaden color; and the Affect may likewise be called *Livor*, to wit, paleness, or wanness: the other he termeth *Melasmata*, that is, blackneses; which latter are especially familiar unto old persons, as often as their Veins are bruised, or opened upon any other cause, and these happen upon any smal or sleight occasion; like as on the contrary, *Pelidna* and *Livores* befal Children and those that are young, and Women, and such as are of a white color.

But

But now, although oftentimes, and indeed for the moſt part, the part is not lift up into a Tumor or Swelling, but the Blood poured forth doth ſo inſinuate it ſelf into the ſpaces of the parts that there is no Tumor at all appearing: yet notwithſtanding ſomtimes the part doth ſwell up, if there be great ſtore of Blood poured out; and this alſo is now and then wont to happen after Veneſection, to wit, if the whol Vein be ſmitten, or if the Wound that is in the Skin ſhall be cloſed up, but that which is in the Vein it ſelf left open and unſhut. For from hence by that Wound that is in the Vein the blood is poured forth, for which when there is no iſſue or paſſage open (the Wound in the Skin being cloſed up) it is oftentimes under the Skin poured out into the whole Arm; and ſomtimes it exciteth alſo a certain ſwelling; but however, it alwaies dyeth the Skin of a Red and livid or leaden colour.

Ecchymoſis But the Affect is various and different; and the *Ecchymoſis* ariſeth in a different manner, ſince that the blood is not evermore poured forth without the Veins; but oftentimes by reaſon of the great abundance of the Spirits and Blood the Veins and Arteries that are terminated in the Skin are filled full of blood, and thereupon the Body becometh coloured; as appeareth out of *Hippocrates*, Epid. 2. Sect. 4. in the end thereof, where he writeth thus; *That all diligence and care muſt be taken, that the paſſion and anger of the Mind may be provoked and ſtirred up, both for the repairing of the colour and the pouring in of blood.*

And to tel you the truth, in what place ſoever there is ſuch an effuſion of Blood, it may in general be called *Ecchymoſis*: yet notwithſtanding, *Paulus Ægineta* in his fourth Book, Chap. 30. (according to the diverſity of the parts affected) reckoneth up three kinds or ſpecies, all which may be called by their ſeveral diſtinct and peculiar names. The firſt is thoſe which we call *Hypopia* (and by *Hippocrates* named *Hypophthalmia*) that is, *Subocularia*, to wit, paleneſſes, or wanneſſes under the Eyes. Now it is termed *Hypopion* from *Ops*, that is, the Eye, becauſe it appeareth under the Eyes; and it is an Affect differing from that we call *Hypopyon* (the difference lying in this, that the former is written by ω and ι, the latter by ο and υ,) from *Pus* (which the Greeks call *Pyon*) becauſe it is a collection of *Pus* or purulent matter under the *Cornea* Tunicle. The ſecond Species is *Hypoſphagma*, which ſome in ſpecial term *Suggillatio*, to wit, an effuſion of blood into the *Adnata* or *Cornea* (both of them Tunicles) of the Eye; touching which we have already ſpoken in the firſt Book of our Practice, Part 1. Sect. 2. Chap. 32. The third Species is that which is cauſed by the Contuſion or bruiſing of the Nails; this Species *Hippocrates* calleth *Hyponychos*, and the Latine Authors term it *Subungulus*, in regard that it is an Affect under the Nails.

Contuſion. Somtimes with *Ecchymoſis* there is likewiſe conjoyned a Contuſion; yea and ſomtimes alſo there is ſo great an abundance of Blood poured forth, that it being collected under the Skin and the Muſcles, it there cauſeth a certain hollowneſs, and lifteth up the part into a Tumor, or Swelling. There is alſo ſomtimes (according to the Nature of the part) conjoyned therewith a pain; from whence it happeneth that more blood floweth thereto, and by this means an Inflammation, yea and ſometimes likewiſe at the length a Gangrene is excited. There is to be ſeen a notable Hiſtory of this in *Johannes Philippus Ingraſſias*, in his *Iatropologia*. When in the yeer 1537. (in an Hippomachie or Tilting, as we call it) the Marqueſs of *Terra Nova* ran with the Baron of *Volaterran*, it ſo chanced, that the armed Knee of the Marqueſs (by reaſon of the Fury and extraordinary fierceneſs of their Horſes) gave ſo great a blow upon the bare and unarmed Leg of the Baron, that the Contuſion or bruiſe that followed thereupon was ſo great and grievous, that the Baron died thereof four daies after. By reaſon of this his ſo ſudden and unexpected death the Phyſitians were queſtion'd and called to an account, for that they had not rightly and as was fitting managed the Cure. In whoſe behalf and defence *Johannes Philippus Ingraſſias* wrote thoſe two Books of Apology under the name and Title of *Iatropologia*. There is likewiſe extant in *Gulielmus Fabricius* (Cent. 2. Obſervat. 83.) another Hiſtory (which you may there ſee) ſhewing how dangerous Contuſions may be.

The Signs.

Suffuſions and theſe Suggillations are eaſily known. For the very colour it ſelf, and the Swelling (if at leaſt there be any) fal under the ſenſe, and are apparently to be ſeen. The Cauſes are known by thoſe things that went before, and ſuch as are likewiſe preſent. For if any external Cauſe went before (as a Blow, a Fall, and the like) the Phyſitian may underſtand it from the relation of the Patient. But if none of theſe ſhall happen, we are then to conſider the Blood in the Body; and well to weigh by what means it becometh thus peccant and offenſive.

Prognoſticks.

1. Although, in truth, theſe *Ecchymomata* are for the moſt part void of all danger, and the blood that is yet thin may eaſily be diſperſed: yet if this be not done, and that the blood be deteined any thing long in the part affected (out of its own Veſſels) it then may prove to be of dangerous Conſequence, in regard that by this means there may be excited both a Corruption of that very part that is affected, and likewiſe a damage and detriment unto the whol Body. For the Blood being clotted together unleſs it be forth-

with

with insensibly discussed, or turned into *Pus*, (which is necessarily done, where the Flesh is withall greatly bruised) so that hence the part yet continueth soft, it putrefieth and corrupteth, and breedeth a Gangrene, and very frequently bringeth Death and Destruction upon the sick Person.

2. But there is great danger threatned, and nigh at hand, when the part affected continueth not any longer green or wan, but inflamed, and becometh very red, hard and distended. Of which we related that former notable History out of *Ingrassias*.

The Cure.

As for what therefore concerneth the Cure, we wil first of all treat of the Cure of that *Ecchymoma* that followeth upon a Contusion. For even this also very often happeneth; and whoever he be that knoweth the Cure of this, he shal have a sufficient store of Medicaments with which he may cure the rest; since that the discussing Medicaments that are here to be drunk have their place likewise in the other. First of al therefore, if the contusion be great, we must use the best of our skil and care to prevent and hinder the afflux of blood unto the place, lest that thereby an Inflammation should be excited. This is to be done by Venesection; for which cause *Galen* commands, That in a fal from on high, and in beatings and bruisings, a vein be opened, and that although the blood doth not greatly abound, yet that by opening a Vein it be drawn forth, lest that an Inflammation should be excited; from whence not only evil symptoms, but oftentimes also even death it self hath its original. And the truth is, this Venesection is forthwith to be ordained and put in practise; & withal at the same time Defensives and Repellers are likewise to be placed neer about the part, that may impede and prevent the influx of blood into the part affected; such as are made up of *Bole-armenick, Terra sigillata or Sealed Earth of Lemnos, Dragons blood, Roses, Myrtles, the Nuts of the Cypress Tree, Galls, Pomegranate flowers, Roots of the lesser Consound*, and the like. As for instance:

Take *Bole armenick, Terra sigillat. of each an ounce and half; Chalk half an ounce; let them boyl in Vinegar: after they be boyled, Take Pouder of red Roses, the pure fine flour of the Root Consolida, or Consound, of each half an ounce; and with the Oyl of Myrtles make a Cataplasm.*

Or only, which is likewise in common use, the white of an Egg shaken together with Rose water; and with hurds or the courser part of flax, applied unto the place affected. Or,

Take *the white of four Eggs, the Oyl of Myrtle and Roses, of each one ounce; Bole armenick, Dragons blood, of each half an ounce; Cypress Nut two drams; a little Vinegar; Mingle them &c.*

And this is also here to be taken notice of, that there be not many moist and clammy Medicaments administred; for by reason of such humid things applied the blood fallen forth out of the Veins is easily putrefied: whereupon divers il and dangerous Symptoms are afterward wont to arise.

But in very truth, when from a fal from some high place, beating and bruising (and the like Causes) the blood is not only gotten together under the Skin and the external parts, but oftentimes also is poured forth into the more inward parts, after the same manner as it is in the Circumference of the Body when the Vessels are opened or broken (which said blood is there clotted and corrupted, and is wont to cause Inflammations, and the worst sort of Feavers, dangerous Symptoms, and very frequently death it self) we must therefore use the best of our endeavor that the clotting and growing together of the aforesaid blood may be hindered, that it may be dissolved, and that it may be evacuated by stool, urine, or sweats, and that with al due and possible speed. For when once the blood hath gotten a putridness the Malady is not so easily cured, nor indeed at al without the most exquisite and singular extraordinary Remedies. Wherefore so soon as there is any the least suspition that the blood is fallen forth without the Veins into the more inward parts, and that it cannot be dissipated by external Remedies, we must then use these things following: to wit, *Rheubarb, Rhapontick, Terra sigillat. Sperma Ceti* (in the Shops termed Parmasitty) *the Eyes of Crabs, Mummy, red Corals, Harts-horn, Madder* (such as the Dyers use in coloring) *with the Waters of Cherefoyl, Carduus, Marjoram, St. Johns wort, Fumitory, Alkekengy, Card. benedict. Scabious, the Syrup of Sorrel, Syrup de Acetositat. Citri, Vinegar*, and the like; which what they are will appear further from the following Receipts, and Prescripts.

Take *Rheubarb, Terra sigillat. Bole armenick, Mummy, of each one dram; make of these a Pouder*: of which give one dram at once, with the Water of Cherefoyl, or Shepherds-Pouch. Or,

Take *Terra sigillat. Crabs Eyes, of each one scruple; Sperma Ceti, Goats blood prepared, Angelica and Gentian Roots, choyce Rheubarb, of each half a scruple; seeds of Carduus Bened. seven grains; Cloves three grains*: Make of these a Pouder for two Doses, to be taken at twice, and drunk with the following Waters:

Take *the Water of the Infusion of Lavender one ounce; the Waters of Cherefoyl, St. Johns wort, Strawberries, of each one ounce and half; Wine Vinegar half an ounce, for twice.* Or,

Take *Terra sigillat. Madder, Mummy, great Comfrey, Rheubarb, of each a scruple: mingle them, and make a Pouder.* Or,

Take *Rheubarb, the Root of Madder, Mummy, Crabs Eyes, the seed of Carduus Mariæ, or Mary Thistle, the Root of round Aristolochia or Birthwort, of each one dram: mingle and make a Pou-*

in the which there is a certain moiſture like unto an Honey-comb. The ſecond is that we cal Ficoſa, *being round and hard; in the upper parts of which there is a certain redneſs, and in the concavity thereof ſomthing like unto the ſmal grains and ſeeds that are in Figs. There is likewiſe a third ſpecies that is called* Ameda: *and they are Ulcers with the which there are in the Head many little holes that are ſomwhat leſs than thoſe that are in the* Favoſa; *and out of theſe there iſſueth forth a certain humidity like unto the water of fleſh. There is alſo a fourth ſort of Puſtule; but they are ſmal and red ones; the figure and form whereof is like unto the Teats of Dugs; from which there floweth out a moiſture like unto the waterineſs of the blood. There is likewiſe a fifth ſpecies thereof, that is dry, and of a white color, like unto the* Lupina; *from which there flow forth as it were hulls, and white ſcales.* Where he conſtituteth four moiſt ſpecies of *Tineæ*, and the fifth ſpecies dry; and under the moiſt he comprehendeth not only *Achores* and *Favi*, but likewiſe even *Papulæ* and *Ficus*. But now by *Papulæ* we are to underſtand al ſmal Puſtules out of which there iſſueth forth an humidity like unto wateriſh blood; ſo called from their figure, by which they reſemble the Teats of the Breaſts. They are called likewiſe *Elcydria*: For although this name (in the general) ſignifieth any little Ulcer; yet notwithſtanding *Galen* in his firſt Book of the Compoſition of Medicaments according to the places, and laſt Chapter, attributeth this name in ſpecial unto the Ulcerous Puſtules in the Head. And indeed *Alexander* (in his firſt Book, and Chap. 7.) yet more eſpecially aſcribeth this name unto the ſaid *Papulæ*; and ſo doth *Paulus Ægineta* in his third Book, and Chap. 3. And *Aetius*, Tetrab. 2. Serm. 2. Chap. 70. And *Celſus* likewiſe under the name of a little Ulcer, ſeemeth in ſpecial to underſtand *Achores* and *Favi*, when (in his fifth Book, Chap. 28. Title, touching the ſeveral kinds of Puſtules, and the Cure of them) he thus writeth: *But out of Puſtules* (ſaith he) *there now and then ariſe likewiſe ſmal Ulcers that are either more dry, or more moiſt; and they are accompanied ſomtimes only with a kind of Itching, but otherwhile they are alſo attended with an Inflammation, or with pain: and there iſſueth forth either* Sanies *or* Pus, *or both of them. And this eſpecially happeneth unto ſuch as are yet in their Childhood, and then but very ſeldom in the midſt of their body, but very frequently in the higher parts thereof.* But now *Sycoſis*, or *Ficus*, is a Tumor ſo called from the reſemblance it hath with a Fig (becauſe that in the Cavity thereof there is ſomething found like unto Fig ſeeds) round, ſomewhat hard, reddiſh, and Ulcerous; from which there is ſomthing ſmal and glutinous or clammy, that now and then floweth out of it, breaking forth of the Chin, and eſpecially the Beard; and ſomtimes alſo it breaketh forth in the Hair. From whence it is that *Celſus* (in his ſixth Book, and Chap. 3.) conſtituteth two ſpecies thereof; where he thus writeth: *There is likewiſe* (ſaith he) *an Ulcer, that from the likeneſs it hath with a Fig, is by the Greeks named* Sycoſis. *And here the fleſh groweth forth; and this is indeed the general name thereof. But now under it there are two ſpecies: the one whereof is an hard and round Ulcer; but the other moiſt and unequal. Out of the hard there floweth forth ſomthing that is ſmal and glutinous; but out of the moiſt there iſſueth forth more, and that of a very ill ſavor. Now both theſe are in thoſe parts that are covered with Hair. But then indeed that which is callous and round breaketh forth more eſpecially in the Beard; whereas* (on the other ſide) *that which is moiſt appeareth chiefly in the Hair. It is bred likewiſe in the Arſe; and then the* Latines *cal it* Mariſca.

Sycoſis.

But here we meet with very great variety of names, eſpecially among the Arabians. And neither ſo only, but likewiſe there is great variety of diffecence that occurreth in explaining the cauſe thereof. For *Galen* in his Book of preternatural Tumors, and Chap. 16. afferteth that a ſalt flegm; but in his firſt Book of the Compoſition of Medicaments according to the places, Chap. 10. he ſaith that a humor mingled of a thin, wheyiſh, and corroding, and likewiſe of a thick, glutinous, and clammy juyce, is the cauſe as wel of the *Achores*, as of *Favi*. *Paulus Ægineta* in his third Book, and Chap. 3. writeth that a nitrous and ſalt flegm is the cauſe of both theſe Affects. *Alexander* in his firſt Book, and Chap. 8. mentioneth three Humors, viz. Choler, Flegm, and the Melancholy Humor. And indeed the upſhot of the whol Controverſie is this; That theſe Affects do ariſe from a Salt and nitrous flegm, with the which there is mingled one while Choler, another while Blood, and ſomtimes likewiſe a Melancholy Humor.

Pſydracia.

In ſpecial, as for what concerneth *Pſydracia*, the Author of the Book of Medicaments that are eaſily provided, unto *Solon*, thus defineth them, viz. That they are ſmal Efflorefcencies made in the Head, like unto thoſe Bladders that riſe high in the ſuperficies. And *Alexander Trallianus* in his firſt Book, and Chap. 5. and *Paulus Ægineta* in his fourth Book, and Chap. 3. following the aforeſaid Author, have reckoned up *Pſydracia* amongſt the Affects of the Head; and thus they define *Pſydracia*; Pſydracia *are certain ſmal eminencies, like unto little Bladders or Puſtules* (thoſe that we cal *Phlyctænæ*) *ſpread up and down upon the ſurface of the Skin.* Yet notwithſtanding that Author of the Introduction unto *Galen*, aſcribeth *Pſydracia* likewiſe unto the whol body; when he ſaith in his 15. Chapter, *That*

Psydracon *is commonly so called, because that it is an Efflorescence all over the Body, and about the white of the Eye, somwhat red in the top thereof.*

The Causes.

The Cause of this Tubercle is a humor mingled together, of Blood, Choler, and a salt and nitrous humor.

The Signs may easily be gathered out of the descriptions already delivered; neither do the *Psydracia* threaten any danger at all.

The Cure.

They are cured by these following Compositions; as *Al. Trallianus*, in his first Book, Chap. 5. and *Paulus Ægineta* in his third Book, Chap. 3. teach us.

Take *the Spume or Froth of Silver, and Ceruss, of each half an ounce; Alum, and the Leaves of Green Rue, of each two drams; these being well bruised and mingled together with Vinegar and Oyl, anoynt the part affected therewith.* Or,

Take *Rue and Alum; bruise them well with Honey, and impose them upon the Head after it is shaven.*

Chap. 33. *Of* Strumæ, *and* Scrofulæ.

THere is moreover another kind of Tumor, which is not excited simply from a humor poured forth into the external parts of the Body or diffused through them; but a humor in which the matter that is the cause of the Tumor is (in a peculiar Membrane) concluded and shut up; and the humor that exciteth this kind of Tumor is changed into almost another kind of Substance. Among these Tumors, in the first place we are to account *Strumæ* and *Scrofulæ*: and indeed touching *Strumæ* in the Neck (or the Kings Evil, as we commonly call it) and *Bronchocele*, we have already treated, in the second Book of our Practise, Part 1. Chap. 25. where we have likewise written much of *Strumæ* in general. And yet notwithstanding, here in this place likewise there is somthing more in general to be spoken touching the same; in regard that (as we shall by and by shew you) they do not only seiz upon the Neck, but also upon divers other parts.

But although this kind of Tumor may not unfitly be referred unto a *Scirrhus*; yet notwithstanding they are not called by this common name; but these Tumors are called *Choirades*, or *Scrofulæ*; the appellations being taken from Swine, that are more frequently troubled with this Malady. And yet notwithstanding *Paulus Ægineta* in his sixth Book, and Chap. 35. rendreth another reason of the name, to wit, from the Rocks *Chærades*: For *Chæras* is a black Rock in the Sea, that is rough and somwhat eminent, so that it seemeth like unto a swimming Hog: unto which Rock indeed (by reason of the roughness of the Tumor) this Disease may be resembled. But yet some there are that seem to make a Difference betwixt *Scrofulæ* and *Strumæ*, when they write that *Scrofulæ* are hardned Tumors, and such as are included within a certain Membrane in the Glandules or kernelly parts; the which if they be generated out of the Flesh, then they are to be called *Strumæ*; but most Physitians reject and approve not of this difference. For *Strumæ* are a Scirrhous Tumor of the Glandules, as *Galen* defineth it in his 14th Book of the Method of Physick, Chap. 11. and such as is shut up in a peculiar Membrane. For the Glandules or Kernels are the Subject of *Strumæ*; and the truth is they arise most commonly in the Neck (both the fore part and the hinder part thereof) and yet somtimes likewise in the Arm-holes, and the Groins. *Meges* a certain Chirurgeon (of whom *Galen* also maketh mention in his Book of the Method of Physick, the last Chapter) hath also observed that these *Strumæ* often arise in the Paps, as *Celsus* writeth in his fifth Book, Chap. 18. And we have told you before in the third Book of our Practise, Part 3. and Chap. 5. that *Strumæ* have been likewise somtimes found in the Mesenterium. If this Affect appear in the Throat then by a peculiar name they call it *Bronchocele*, *Bocius*, and *Hernia Gutturalis*. This is a great and round Tumor of the Neck, between the Skin and the rough Artery; in the which there is included somtimes Flesh, and another while a certain humor like unto Honey or Fat. But yet notwithstanding these *Scrofulæ* differ from other Glandulous Tumors; and that first in the number, because that in *Scrofulæ* there are very many Kernels that swel up; and one dependeth upon the other in the superficies of the Skin, like unto Grapes that hang down from one and the same Bough; and moreover, because that *Scrofulæ* have deeper Roots then the other Glandulous Tumors.

What Strumæ *are.*

The Causes.

But now these *Strumæ* have their original from a flegmy humor, and likewise (according to others) from a Melancholly, or else from a humor mingled of Flegm and Melancholly: whereupon it is that such as are Flegmatick, Melancholly, Glutoinous, that are wont to eat meats that are cold & moist, and to drink cold waters, are most especially troubled with these *Scrofulæ*. And hence it is that in certain Regions where the Inhabitants make use of Crude and snowy waters, they are all of them for the most part afflicted with the said *Strumæ*. But now these *Strumæ* are generated, not suddenly, and all at once, but by degrees, one after another; and first of all the matter floweth in unto one Glandule, in the which there is excited a Tumor,

soft

soft and loose; and then unto another, in which there is in like manner excited a soft Tumor, which in a short time is hardened; until at the length there hang down from the place affected many Glandules, as it were so many Boughs or Branches.

Aetius in Tetrab. 4. Serm. 3. Chap. 5. out of *Leonidas*, tels us of a twofold manner of the Generation of these *Strumæ*, where he thus writes: *These* Strumæ (saith he) *are a Flesh somwhat white, easily encreasing and growing, conteined in a Membrane; and in brief, they are Glandules hardned, that arise in the Neck, under the Arms, and in the Groyns, where the Glandules are situated under the Vessels, like as also in other Glandules already mentioned. And somtimes likewise (but this is very rare) they are bred from the Flesh of the self same places, which by a certain affinity is converted into the nature of* Strumæ, *and is augmented by the acceß of Matter.* For first of all, the Glandules of the said parts (in like manner as all other parts, the Flegm being dried, or the Melancholly humor, or both of them together mingled) become hard like as a *Scirrhus* doth. But somtimes the very substance of the Glandulous flesh being dried waxeth hard; which yet notwithstanding being afterward moistened by the melancholly or Flegmy humor, increaseth, and becometh preternaturally augmented. Yet notwitstanding, in regard that both those waies of generation are coincident, and in a manner one and the same, *Galen* thereupon seemeth for the most part to sleight this difference, and in his Book of preternatural Tumors, Chap. 11. he there saith, that such as are affected with hardened Glandules may properly be said to be affected with *Strumæ*.

But yet notwithstanding touching the Causes, we have before in the place alleadged acquainted you, that *Platerus* determineth, that Flegm alone, and the Melancholly humor, are scarcely sufficient to generate *Strumæ*, seeing that if they were from those alone, they would not then be of long continuance, but they would rather be obnoxious unto putridness or turned into *Pus*, like as are other Tumors; but that these *Strumæ* derive their original from a Juyce nourishing these parts. For whereas Glandules are nourished with a thicker Juyce than other fleshy parts; if this Juyce exceed in Quantity, it then generateth divers kind of Tumors. But although this be altogether to be granted; yet notwithstanding this is not altogether impossible, but that some melancholly and flegmy humor be mingled together with the aliment of the Glandules.

Now this matter of the *Strumæ* is included in a peculiar Membrane, which the formative faculty (that is seated and planted in all the parts that have life in them) produceth. For whenas there is some Membrane distended, or even broken, by the superfluous humor that floweth thereto, Nature extendeth and dilateth the same; and attempteth the structure and forming as it were of a new Membrane.

The Differences.

These *Strumæ* are by some distinguished into Malignant and Benign; and they will have those to be benign that are without an Inflammation, & without pain; and those they will have to be malignant that have with them both Inflammation and pain, and that are the more exasperated by Medicaments. But we must know, that those *Strumæ* that are termed malignant, are not properly *Strumæ*, but a Tumor as it were mingled of *Strumæ* and a *Cancer*; so that this Tumor doth not alone proceed from a flegmy and Melancholly humor, but it hath likewise mingled together with it a black Choler. They are likewise distinguished in this manner; that some *Strumæ* are free, others of them infiltrated. Those of them are said to be free, and simple, that are not complicated with any Vessel, or tied together with it: but such of them as are knit together either with some notable Vein, or some Nerve, and are as it were wrapt and folded within them, these we call *Strumæ* infiltrated, or haply (as by a name more fit and congruous) *Strumæ* implicated.

Those things that should have been further declared touching these *Strumæ*, have already been propounded in the place alleadged, *viz.* in the second Book of our Practise, Part 1. Chap. 35. and there they may be seen.

Chap. 34. *Of* Ganglium, *and* Nodi.

Anglion, so called by the Greeks, and by the Latines *Ganglium*, is by some reckoned up among the Affects of the Head. But by *Paulus Ægineta* in his fourth Book, Chap. 16. and Book 6. Chap. 39. and by *Aetius* in Tetrab. 4. Serm. 3. Chap. 9. it is attributed unto many parts, and it is an Affect of the Nervous parts; and by the Author of the Physical Definitions it is thus defined, *viz.* that it is a preternatural rowling together, or knot of a Nerve, which groweth together into one Body. The very same Tumor *Guido* in his second Tract, Doct 2. Chap. 4. seemeth to call it *Lupia*; and *Tagautius* in his Chirurgicall Institutions, Book 1. Chap. 13. writeth, that it appeareth in *Aetius* (out of the Cure *Philagrius*) that *Lupia* of the modern Physitians, the *Glandula* of *Avicen*, and *Ganglion* of the Greeks, is one and the same Affect.

But by what names these Tumors are called by the Germans is not very evident. For if we well weigh the Descriptions, and Signs, yea and the Cure likewise of *Ganglion*, and *Lupia* of the Greeks, and the latter Physitians, as also of the

Uberbein. Glandules of *Avicen*, *Ganglium* is that Affect which by the Germans is called *Uberbein*, so called, not that it is indeed a Bone, but because it is a Tumor upon a Bone, to wit, in that same place where the Bones are only covered with the Skin, or because it resembleth the hardness of a Bone. Notwithstanding *Platerus* doth not cal those Tumors that arise from the Nerves (and which Authors every where describe under the name of *Ganglium*) by the name of *Uberbeine*, but a peculiar kind of Tumor, when (the *Periostium* being shaven, or eaten through) there springeth up, and groweth unto the former as it were a new Bone. But now that Tumor which he propoundeth under the name of *Ganglium*, viz. which is bred about the joynts, especially the Knees, somtimes comprehending the whol Joynt (and this one while in a more narrow, and other while in a broader limit, and somtimes also so stopping and hindering the motion thereof that the Member is altogether either motionless, or else so that it cannot be wholly and entirely moved) seemeth to be that

Glied-shevva. Tumor which the Germans cal *Glied-shevva*; to wit, because (as it were a certain Mushrom) it ariseth under the Skin, neer about the Joynts, and especially the Knee, which is not alwaies round, but often overspreadeth the whol Knee; when yet notwithstanding *Ganglion* is alwaies a round Tumor, as *Ambrose Parrey* writeth in his sixth Book, and Chap. 20.

But (as I told you likewise before) there is a great confusion in the names. And therefore (as *Joh. Tagautius* in the first Book of his Physical Institutions, and Chap. 2. adviseth us) the thing it self is to be heeded with al care and circumspection; and as for the names, we need not much to regard them; since that oftentimes one and the same word hath in several Authors various and different appellations. *Ganglion* ariseth indeed in al, or the most parts of the body, (and yet more especially in those parts that are moved) neer about the Joynts, to wit, In the Hands and Feet, and in those very places where the Bones are only covered with Skin, and where there is a concourse of the Tendons, Ligaments, and Nerves. And yet notwithstanding *Aetius* addeth the Head and Forehead, as likewise the Elbows and Arms; but it is but seldom that it happeneth in these parts.

The Causes.

That it hath its original from a blow, or from hard labor, *Paulus* and *Aetius* teach us; which is indeed to be understood of the evident cause. But how these evident causes come to produce those Tumors, is not so evident and manifest. Vulgarly, the greater part determine that they arise from a dull, sluggish, thick flegm, or else from Melancholy. But others assert (and that more rightly) that by means of some fal, by reason of extension, or of some extraordinary hard labor, and over working, (by al or any of which either a Nerve or a Tendon is too far extended, or likewise, according to the Membrane, even as it were broken) the nutriment of the Nervous part doth as it were sweat forth, and adhere neer about the Fibres and the substance of the same Nervous part, and so becometh changed into this substance by reason of the formative faculty of the said parts, and then covered with a peculiar Membrane. After which manner (if the *Periostium* be opened) even in the Bones, their nutriment is turned into a boney knot, as *Platerus* giveth us to understand. For look as it is in Trees, if their Rind or Bark be wounded, or in any other manner opened, Nature sweating forth the aliment suffereth it not rashly to diffuse it self al abroad, but changeth it into a knot; so in like manner, albeit the Membranes that wrap about the Bones or Nervous parts may be broken, yet Nature permits not the aliment rashly to flow abroad through the open passages, but from thence (under the Skin) formeth a Tumor, included and shut up in a peculiar Membrane.

But now that *Ganglion* that *Platerus* describeth happeneth not from the default of one only Nerve or Tendon, but chiefly in those places where there is a concourse of Tendons, Ligaments, and Nerves; and especially about the knee, either when those parts by reason of their overgreat motion are very much exercised, or else while Wounds are in curing. For if the juyce of these parts, to wit, of the Tendons, Nerves, Membranes, and Ligaments, shal chance (upon the occasion of the aforesaid Causes) to flow forth abroad out of the said parts, and shal withal begin to be luxuriant, and to abound, and shal likewise adhere unto the Fibres of the same parts, it is then changed into such a like fungous or Mushrom-like matter, which oftentimes overspreadeth the whol joynt; and is thereupon by the Germans called *Der Gliedshevva*.

And yet notwithstanding it may likewise so chance, that a vitious humor abounding in the body may flow in into such a like weak part, and may be mingled together with the said thick juyce that nourisheth these parts, and may (through that open passage) flow together with it unto the aforesaid parts, and may there augment the Tumor.

Signs Diagnostick.

This Tumor is bred in those parts that are not covered with much flesh, but only by the Skin; and therefore it lieth not hid very deep: and it is now hard, now soft; now greater, now less; and somtimes it is in bigness equal unto (and many times greater than) an Egg; it is void of al pain, and yet notwithstanding if it be forcibly pressed together, it then manifesteth a certain kind of dul

and

and ſtupid ſenſe; it may be thruſt and moved unto the ſides, but neither forward nor backward.

That *Ganglium* which *Platerus* deſcribeth is a Tumor for the moſt part ariſing in the Knee, ſoft, without pain, and of a different color; from ſmal beginnings ſometimes encreaſing to ſo great a bulk and magnitude, that it comprehendeth the whol joynt; from whence it chanceth that the ſick perſon can neither ſtand upright, no go ſtraight; neither is he able in going to tread upon the ground, or at leaſt (as it were) only on tiptoe.

Prognoſticks.

1. This Diſeaſe is of long continuance, and oftentimes laſteth for many yeers; and accompanieth the ſick parties even unto their dying day.

2. Thoſe of them that are in the very junctures of the joynts, impede and hinder the motion of the whol Member.

3. The *Ganglium* likewiſe that is neer about the Joynt (unleſs it may be taken away by Medicaments) is altogether incurable. For it admitteth not of Section or cutting, in regard that it may eaſily happen, that by Section a Nerve, Tendon, or Ligament may be hurt.

The Cure.

Univerſal or general Remedies having been firſt premiſed, it is requiſite that the Tumor be mollified and diſcuſſed; or (if this cannot wel be done) that it be ſuppurated, or cut out. Therefore if *Ganglium* or *Nodus* (the Knot) be recent and new, and the little Bladder within which it is included be yet tender; we muſt then in the firſt place do our endeavor that the ſaid bladder may be broken. And therefore the Tumor is to be rubbed with the hand ſo long until it wax hot, and become ſofter; and afterward let it be cloſe preſſed together with ſome thin plate, or ſome other ſolid thing, ſo long that the bladder may be broken, and that the matter therein included may be thereby diſperſed. And therefore let a thin plate of Lead be impoſed upon the place affected, and bound cloſe upon it with a Swathe; which is not to be removed until after ten daies. Others there are that firſt of al anoint the Tumor with Ammoniacum diſſolved, in the form of an Emplaſter, and then after they apply a thin plate of Lead. *Oribaſius* made uſe of this that followeth:

Take Ceruſs, Pitchy Roſin, old Oyl, Ammoniacum, Galbanum, of each one ounce; Wax four ounces; mingle them, &c. Or,

Take Aloes, and Myrrh, of each ſix drams; Litharge of Gold one ounce; Ladanum half an ounce; Ammoniacum, the Fat of a Calf, and of a Fox, of each ſix drams; Oyl of white Lillies two ounces; Wax as much as wil ſuffice; make an Emplaſter. Or,

Take of unſlaked Lime, the Fat of a Gooſe, of each one ounce; Ammoniacum half an ounce; Turpentine one ounce; mingle them, &c. Or,

Take of the Emplaſter Oxycroceum one ounce; the Mucilage of Marſh-mallow ſeed, and Fenugreek ſeed, of each half an ounce; Galbanum, Sagapenum, and Ammoniacum diſſolved in Vinegar, of each three drams; Roſin ſix drams; white Wax half an ounce; Mingle them, and make an Emplaſter. Or,

Take Gum Ammoniacum, Bdellium, Galbanum diſſolved in Vinegar, of each one ounce and half; Oyl of white Lillies, of Camomile, of Bays, the Spirit of Wine, of each half an ounce; the pouder of the Flowerdeluce Root, and live Sulphur, of each half a dram; mingle them, and make an Emplaſter.

If the *Ganglia* give not way unto theſe Medicaments, we muſt then betake our ſelves unto thoſe Remedies that cauſe ſuppuration. As for Example:

Take the Roots of white Lillies, and Marſh-mallow Roots, of each an ounce and half; the Root of Fern one ounce; fat dried Figs, in number ten; the Root of Squils (or the Sea Onion) one ounce; the Flowers of Melilote, and Elder flowers, of each one ſmal handful; boyl them in the Broth of a Wether-Sheeps Feet, adding thereto a ſmal quantity of Vinegar. Afterward let them be wel bruiſed together, and then paſs them through a hair ſieve, and then add, of Wheat flour, and the flour of Lupines, of each half an ounce; the fat of an old Sow, Ducks fat, and Gooſe fat, of each two ounces; the Dregs or Lees of the Oyl of white Lillies three ounces; and ſo make a Cataplaſm.

Section.

Ganglia and *Nodi* may likewiſe be taken away by Section; ſuch alone of them that conſiſt in the Head, the Forehead, and other places without the Joynts. But thoſe of them that conſiſt in the Joynts are not ſafely to be cut, there being cauſe to fear leſt that the Nervous parts that lie underneath be hurt thereby, and ſo conſequently the motion of the Member quite taken away. As (in like manner) it is not fit to cut thoſe *Ganglia* that are neer about the Jugular Veins, for fear of an Hemorrhage or flux of blood. Now for the manner of Section, it is this; Firſt of al, there muſt be made a ſmal Wound in the Skin, even unto the bladder wherein the matter of the Tumor is included; through which a Probe of the thickneſs of a finger, and round at the end, but hollow in the midſt, is to be conveyed in betwixt the Skin and the bladder, and then to be drawn about even unto the very Root of the *Ganglium*: and then after this (upon it) the Skin is to have an Inciſion made therein deep enough, in the form of the letter X; and from the corner of the Bladder it is to be drawn along towards the Root: and if there ariſe any Hemorrhage from the

the thicker Vessels upon their being cut about the Root, it is in a fit and convenient manner to be stanched and stopt; and then upon this the whol Tumor (together with the Membrane) is to be extracted and drawn forth, and no part thereof to be left remaining behind; or if haply there should be any thereof left behind, it is then to be consumed with Caustick Medicaments.

Callous or Boney *Nodi* (by *Platerus* so termed in special) are hardly cured, and not at al, if they be inveterate and hardened. Such of them as are curable are to be cured by those or such like Emollients as were even now propounded. Here likewise those Cataplasms are very useful that are made of *Mandrake* Root, the Leaves of Hemlock, Henbane, the dead Nettle, boyled in Vinegar, and mingled together with Emollient Greates.

If these *Nodi* tend towards the Joynts, and so hinder their motion, and have their abode in those places that are naked, and only covered with the Bones, then the Skin is to be opened; and with a sharp Iron the *Nodus* (by a continued stroke) is to be cut away from the Bone; and the Wound is then to be cured in a fit and convenient manner.

Ganglia in special so called (or those Mushrom-like spungy Tumors that arise about the Joynts, and especially the Knees, somtimes wholly comprehending it, and hindering its motion) are not to be cured without much difficulty. For Section (in regard that it cannot be administred without hurting the Tendons, Ligaments, and Nerves) hath here no place. And therefore we ought to assay that by Emollients and Digestives they may be discussed: but yet notwithstanding we ought evermore to beware that there follow not any suppuration hereupon, which in these places is wont to excite incurable Ulcers, by which the Nervous parts neer about the Joynts are corrupted.

In this case the Medicaments before propounded are likewise very useful and profitable. Or else let a Fomentation be provided of the Roots of Marsh-mallows, white Lillies, Briony, the wild Cucumber, Sowbread, the Leaves of Mallows, Marsh-mallows, dead Nettle, Henbane, Ground-pine, Sage, Primrose, the flowers of Camomile, Elder, Wall-flowers, Melilote, Linseed, Fenugreek seed, Bayberries. Or,

Take *the Kernels of Wallnuts three ounces; the meal or flour of Lupines one ounce and half; the pouder of Flowerdeluce Root, and Earthworms, of each an ounce; Honey as much as wil suffice, and make a Cataplasm.* Or,

Take *Ship-Pitch two ounces; dissolve it in the Oyl of Earthworms, and the Oyl of Flowerdeluce, of each one ounce and half; and then ad thereto of Ladanum and Mastick, of each two drams; Bdellium, and Styrax Calamite, of each one dram; the pouder of Earthworms half a dram; mingle them, &c.*

The *Diasulphur* Emplaster of *Rulandus* is likewise here very useful, and of singular benefit: but especially, and in the first place, Natural Sulphury Baths.

Chap. 35. *Of* Meliceris, Atheroma, *and* Steatoma.

THese kind of Tumors have this one thing proper and peculiar unto them, to wit, That the matter that is contained in them is shut up in a peculiar Tunicle, or little Bladder. And they take their name from the matter contained in them. For if the matter that is shut up within be like unto Honey, it is then called *Meliceris*, (and the Latines usually cal it *Mellifavium*;) if it be like to Frumenty (which the Greeks term *Atheria*) we then cal it *Atheroma*; and lastly, if it be like unto Suet, it is then by the most called *Steatoma*. For *Meliceris* (as it appeareth out of *Galen* in his fourteenth Book of the Method of Physick, and Chap. 6. and out of *Aetius*, Tetrab. 4. Serm. 3. Chap. 7. as also out of *Paulus Æginet a*, in his sixth Book, Chap. 36. and lastly, out of *Celsus* in his seventh Book, and Chap. 6.) is a Tumor without pain, containing a matter like unto Honey that is shut up in a little Nervous Skin. But *Atheroma* is a Tumor without any pain, containing in a Nervous Tunicle a Humor like unto Frumenty, or a Pultis. And *Steatoma* is in like manner a Tumor containing within a peculiar Membrane a Humor like unto Suet.

Meliceris what it is.

Atheroma what it is:

Steatoma what it is:

But now touching *Meliceris*, it is here to be noted, That it is a Disease not one and the same with *Meliceria* (of which *Aetius* maketh mention in his fifth Book, and Chap. 28.) but a disease different from it. For *Meliceria* (as *Celsus* himself hath it) is a kind of Ulcer, that is so called from the resemblance it hath with a Bee-hive; which said Disease we have already explained in the second part, and Chap. 3. of Infants Diseases, and by others it is likewise called *Kerion*, *Favus* or Bee-hive; and it is an Ulcer that is very ful of holes, chiefly peculiar unto the Head, pouring forth at those holes a corrupt matter like unto Honey; and it hath its original from flegm that is salt or nitrous. But *Meliceris* (touching which we are here treating) without any hole at al, in whatsoever part of the body it happeneth to be, it containeth within under a Nervous Membrane a substance like unto Honey.

The Causes.

Now all these Tumors are referred unto the Pituitous or Flegmy, and they are vulgarly said to be

be excited from a Pituitous or Flegmy humor, which in progress of time is by degrees and slowly changed into a Matter that is sometimes like unto Honey, sometimes unto Frumenty, and now and then likewise resembling Suet.

Platerus (as we also before told you, in the second Book of our Practise, Part 1. Chap. 25. where we treated of *Strumæ*) hath a peculiar Opinion by himself touching the Causes of these Tumors. For he thinketh that these aforesaid Tumors are generated from excrementitious humors (for if any such thing should be generated out of these kind of excrements, he conceiveth that it could not be so stable and firm, but that it would rather be obnoxious to putridness and corruption) but from an alimentary Juyce, to wit, such as is by Nature ordained for the nourishing of the part. For if the humor be thicker than is convenient for the nourishing of a fleshy part, then (saith he) a harder sort of Tumors then are the *Sarcomata* are sometimes produced; and again, if this humor be extraordinary thick, then a *Scirrhus* is generated. But if the Tumor be not so hard, then in a short time it endeth in an Impostume, in the which there may be generated a different matter, according to the difference and Variety of this Juyce that hath bred this Tumor, & the mingling therof with other humors; which yet notwithstanding is not suppurated in like manner as other Impostumes are that are bred from the Blood; neither is it turned into *Pus*, but into another kind of substance that is included in a proper Membrane, or Bladder. And in this manner (as he writeth) are generated *Melicerides*, *Atheromata*, and *Steatomata*. But he addeth likewise that unto the generation of such like Tumors as these this conduceth very much, to wit, if together with this Juyce that ought to nourish the flesh, a portion of that Nutriment of some other part (that ought to be nourished by an extraordinary thick Juyce) departing from it, and being carried into the fleshy seats together with their Nutriment, there beget in them such an hardness. And this he likewise endeavoreth to prove even by this Argument, to wit, that in these kind of Impostumes bred from those Tumors there is to be found somthing like unto the substance of other parts resembling sometimes Hair, sometimes a Nail, sometimes a Bone, and now and then a Glandule; which (saith he) could not wel any otherwise be bred, or produced from any thing else then the juyce nourishing these parts, either in the Skin, or in the flesh neer unto it, as being hither brought & conveyed together with the proper Nutriment of the Flesh. And from the same he conceiveth that it cometh to pass, if at any time there be found in an Impostume any thing that resembleth a Bee-hive, a Pultise, or Honey; that this proceedeth from the fatter part of the Blood, that causeth a fatness; and this indeed he conceiveth to be from the fleshy Juyce that is not as yet converted into *Pus*, but by maturation by means of the heat boyled as it were and hardened into such a tenacious humor; the which if it be any further torrified, insomuch that this Juyce become more earthy, then it resembleth somthing else, as Coals, smal Stones, or Gravel, and the like. These things if they be in a proper and peculiar Membrane, then (as he writeth) these also are bred from a Membranous Juyce proceeding from hence.

But now, as touching this Opinion, there are certain things to be taken notice of. For first of al, it doth not yet from hence appear, what the cause is why such like tumors as these are not bred in al bodies, neither yet in all parts, out of that Juyce by which they are nourished. And hereupon, the Cause that is to be rendred why that humor floweth out of the parts, and that thereupon a Tumor is excited under the Skin, I conceive to be this, that the Membrane that covereth any part whatsoever, and encompasseth it, is (either by some external and violent, or else by some internal Cause) either broken or corroded and eaten quite through, and exulcerated (which in the Generation of *Nodi* or knots in the Bones, *Platerus* granteth that it may so happen in the *Periostium*) so that the way and passage being opened, the aliment or nourishing Juyce flowing forth is no longer kept in and shut up in the part affected, but that it sweateth forth through this open passage. Which yet notwithstanding Nature that is never idle permitteth not rashly to be done; but it beginneth further to extend the very Membrane it self, and to shut up the Juyce flowing forth; like as we see it to be done in Trees where (the external Bark being cut) there is in the very like manner a *Nodus* or knot formed. And moreover, that the Juyce which affordeth matter unto the Tumor is chiefly destined and ordeined for the nourishing of the part, this I wil readily grant; but yet *Platerus* himself cannot deny but that in progress of time vitious humors may be likewise driven forth thither. Neither is it requisite that it should be immediately converted into *Pus*; in regard that the vitious humors mingled together with the aliment may for a long while retain their own Nature, without any corruption, and conversion into *Pus*; as it evidently appeareth in the *Cachexy*, and *Scabies* or Scabbiness, and the like affects in the Skin. But I very much doubt and question, whether that different matter that is found in such Tumors hath its original from the proper aliment of the neer adjoyning parts, the Hairs, the Nails, and the Bones, flowing together into some other place, and there mingling it self with the proper aliment of the part affected. Neither is Matter sufficient, or all that is required unto the formation of Hairs, Nails, Bones, and the like, but first of all, and especially there is necessarily required the formative faculty, which in the fleshy part formeth Flesh, and in the membranous part a Membrane, and not Bones; and there

there is unto each particular part a proper and peculiar Membrane, which if it cannot attain unto its own end by reason of the unaptness of the matter, it then formeth something like unto it; and in a fleshy part it effecteth something that is like unto Flesh, and in a membranous part somwhat that resembleth a Membrane.

Signs Diagnostick.

All these Tubercles or smal Tumors have their rise from a very mean and inconsiderable beginning, and they are long, and by little and little increasing; and they are included each one in its own peculiar Tunicle. And *Meliceris* is indeed more round in figure, and more extended, and when pressed down by the Fingers (by reason that the thickness of the humor is not great) it speedily yieldeth and giveth place, and upon the removal of the Fingers it as speedily returneth back again. For although *Paulus Ægineta* in his sixth Book, Chap. 36. writeth that *Meliceris* yieldeth unto the touch, even as if it were some loose body; and that it is slowly diffused, but very soon collected and gathered together again; yet without doubt, the text is depraved, and something omitted by the carelessness and oversight of the Writers, which appeareth even from this, that he altogether omitteth the Signs of *Atheroma*. And therefore without all doubt it is thus to be read, the omissions being supplied out of *Aetius*; Steatoma *is harder then the other, and resisteth upon the touch, and having the bottom thereof more solid. But* Atheroma *yieldeth when it is touched, as it were a certain loose body, and returneth back but slowly; but* Meliceris *giveth place speedily unto the touch, and then it is very suddenly again collected.* And although *Steatoma* be hard,; yet notwithstanding it differeth from *Strumæ*, because it is nothing so hard as *Strumæ*; neither hath it an unequal Tumor, like as *Strumæ* hath.

But what these Tumors have within, as it may be guessed at by conjecture, so true it is that it cannot be certainly known, unless it be when they are cast forth; as *Celsus* tels us, in his seventh Book Chap. 6.

Prognosticks.

1. The truth is that these Tumors have no danger at all conjoyned with them: and yet notwithstanding they oftentimes continue long, & are (without any hurt) carried about, and neglected.

2. Yet notwithstanding they often of their own accord end in an Impostume. Which if they do not, they are not so difficultly cured as *Scrofulæ* and *Scirrhi*.

3. Those of them that are elevated, and exposed unto motion, and the touch, are easily curable. But such of them as are seated and fixed more deeply, and not exposed to the Touch, are more difficultly cured; and in Chirurgical attempts they require the greatest care and diligence, by reason of the imminent eruptions of Blood, and the pricking of the Nerves. For very many Chirurgeons there be that (for want of skil) together with these like Tumors cut away those Nerves that lie under them.

The Cure.

Although these Tumors differ in their names, and each of them contein a peculiar Matter: yet notwithstanding they have almost one and the same way of curing. For Universals and generals being premised, and the Body throughly purged from the vitious humor, the matter that is the cause of the Tumor is together with the Tunicle to be taken away: which is done if the matter be either discussed; or (if that may not conveniently be done) suppurated; or else if the Tumors be cut forth. In *Meliceris* this threefold kind of Remedy hath its place; *Atheroma* is Cured by Discussives and Suppuratives, and for the most part hath no need at all of Section. As,

Take *Laudanum, Bdellium, Galbanum, Ammoniacum, Propolis, and Turpentine, equal parts of them all; and mingle them.*

Very useful likewise is the Emplaster made of Ammoniacum, Pellitory, and the Oyl of the Juyce therof; by which I have seen such a Tumor cured in the Jaw-bone broken, and long white strings like threads (such as are sometimes found in Cancers) drawn forth.

Unslaked Lime also mixed with Grease or Oyl is very useful, and of singular benefit. Or,

Take *Ship-pitch one ounce, Ammoniacum and Sulphur, of each half an ounce, Mingle, &c.*

Take *of the Root of Sowbread, and Swines Grease, and a little Sulphur; and of these make an Empaster.*

If the Tumor open not of its own accord, then Section is to be ordained; that so the little Bladder (whether it contein a Substance like Honey, like a Pultise, or a fat substance, or any other) may be pulled forth, and taken away. But the Skin is not to be cut transversly or overthwart, but strait forward, or else somwhat obliquely, like unto the figure and form of a Myrtle Leaf; and the Membrane conteining the humor is to be freed from the Skin, and the part lying under it; great care and caution being had, left that the said Membrane or Bladder be hurt (which wil most certainly be, if the Skin be not dissected and opened with one touch of the Instrument) and so the humor that is conteined therein flowing forth all abroad hinder the operation, and by this means there be some of it, or something of the humor left remaining behind. And yet if this should chance, and somwhat should be left behind, it is to be consumed by these Remedies that we call *Cathæreticks*. For if there be any part of that Tunicle left to remain, the Tumor wil again return.

If

If theſe kind of Tumors be in the Head (the little Bladder being taken forth) let the *Pericranium* be cut, and the Skul ſhaven, leſt that there be any Root that may be able to generate a new Tumor left remaining behind. But if the ſick perſon wil at no hand admit of this ſaid Section, or if otherwiſe it may not conveniently be done by reaſon of the Veins, then the Skin is to be broken through by Cauſtick Medicaments. The little bladder being taken forth, the Ulcer is to be conſolidated; and if the Skin be more looſe and extended than it ought to be, ſo that it cannot conveniently be drawn together; in this caſe whatſoever is ſuperfluous is to be cut away.

Chap. 36. *Of* Teſtudo, Talpa *or* Topinaria, *and* Natta.

AND hither likewiſe belong thoſe Tumors, which (to ſpeak truth) are referred to *Melicerides*, *Atheromata*, and *Steatomata*. But becauſe they privily happen unto the head, therefore they have peculiar names impoſed on them; which yet notwithſtanding we find no where extant in the more Ancient Greek or Latine Authors; but they have been invented and hammered out by the more modern and barbarous Latines; to wit, ſuch as are theſe; *Teſtudo*, *Talpa* or *Topinaria*, and *Natta*.

Teſtudo what it is.

To wit, *Teſtudo* is a great Tumor, ſoft, or at leaſt not very hard, in the Head, of a broader form, like unto, and after the manner of the Tortoiſe; from the likeneſs whereof it hath taken its name; growing forth at the firſt in the form and faſhion of a Cheſnut, but afterwards in the figure of an Egg; in the which there is contained a ſoft kind of matter (a certain Tunicle being drawn over it; from whence it is by Authors referred to *Melicerider*) which ſticketh ſo faſt in the Skul, that for the moſt part it vitiateth and defileth it, and bringeth upon it a polluting rottenneſs.

Talpa

Neerly allied unto this is the Tumor *Talpa*, ſo called becauſe that look as the Mole (by the Latines called *Talpa*) runneth under ground, juſt ſo this Tumor under the Skin feedeth upon the *Cranium* or Skul. Some of thoſe aforeſaid Latine Barbarous Authors comprehend this Tumor under the name of *Teſtudo*, neither do they make any peculiar mention of *Talpa*. But others of them have their peculiar Tracts touching this Tumor *Talpa*; and *Vigo* in his ſecond Book, Tract. 3. and Chap. 1. doth expreſly diſtinguiſh *Talpa* from *Teſtudo*; and the truth is, they differ in their matter, which in *Talpa* is more thick and groſs than in *Teſtudo*. And therefore like as we have ſaid that *Teſtudo* may be referred unto *Melicerís*, ſo may *Talpa* be referred to *Atheroma*. Some cal it *Topinaria*. But others notwithſtanding ſay that *Topinaria* is a different Affect, and ſuch as is familiar and common unto Children; and that it is bred out of ſweet flegm; which is manifeſtly declared by the viſcouſneſs and clammineſs of the rotten filthineſs, as alſo by the whiteneſs thereof: and ſomtimes from a flegm mingled with Blood; as the color declareth, which is not very red, and it ſoon cometh to a maturity; and ſomtimes likewiſe from Melancholy, or Choler; as *Gulielmus Placentius* writeth of this ſame Affect in the firſt Book of his Chirurgery, and Chap. 5. *Johannes Philippus Ingraſſias*, in his Book of Tumors, Tract. 1. Chap. 1. without any the leaſt ſcruple conceiveth that this Tumor is to be referred to *Hydrocephalus*. But in regard that *Hydrocephalus* is bred of Water, and hath no blood at al mingled therewith, neither may be ſuppurated, this therefore cannot be granted unto the ſaid *Ingraſſias*, nor by any means allowed of.

Natta

And laſtly, there is another Tumor which they cal *Nata*, *Natta*, and *Napta*, being great and ſoft, without any pain and color; growing forth eſpecially in the back, and ſomtimes notwithſtanding breaking forth in the ſhoulders, and other parts; hanging by a ſmal ſlender Root: but yet ſo greatly encreaſing that it weigheth ſome pounds; and is in bigneſs equal unto a Melon, or Gourd; which becauſe it hath not alwaies one and the ſame form and figure, it hath likewiſe therefore by Authors divers and ſeveral names conferred upon it. The matter that is therein contained doth indeed now and then ſeem to be fleſhy; but in truth it is no fleſh, but like unto fat; and therefore it may not unfitly be referred unto *Steatoma*.

The Cauſes.

They refer the cauſe of theſe Tumors unto a ſalt flegm, or elſe a flegm mingled with Choler. But in regard that theſe Tumors may be referred to *Melicerides*, *Atheromata*, and *Steatomata*, it may therefore moſt fitly be determined and aſſerted, That theſe Tumors have the very ſelf ſame cauſe that thoſe ſaid Tumors have: only here lieth the difference, That in theſe there is greater ſtore of matter, and thereupon it is likewiſe that theſe Tumors arrive at a greater bulk and bigneſs than the former.

Signs Diagnoſtick.

Theſe Tumors are eaſily known from the deſcriptions before declared; for they are ſoft Tumors, or at leaſt ſuch as are not very hard; broad and large, and ſhut up in their peculiar Membrane.

Prognoſticks.

1. If theſe kind of Tumors be in the Head, they then are dangerous, by reaſon of the vicinity and neerneſs of the Skull, in regard that they corrode the Skul, and corrupt it; eſpecially about the Sutures.

2. If there be present a great corruption of the Skul, it is then far better to let this Tumor alone, and not meddle with it, than to cure it.

3. Those of them that are without any corruption of the Skul, are cured with more safety.

4. Like as it was in the Tumors mentioned in the former Chapter, so it is likewise in these; unless the whol Tunicle be drawn forth together with the humor, there is no perfect health and soundness to be expected, or hoped for; since that if there be any thing left behind, there wil from it a new Tumor arise, and break forth.

The Cure.

Universals and generals being first premised, and the body sufficiently evacuated, the matter constituting the Tumor is to be taken away, which is done by digestive and resolving Medicaments, or by those that suppurate, or by Chirurgery. And therefore if the Tumor be without any Ulcer and corruption of the bone, then let discussing Medicaments be administred. Now the Discussives are such as are wont to be used in *Scrofulæ* and Tumors. But it is somwhat rare that these Tumors are cured by Discussives. If therefore they cannot be so taken away and removed, to wit, by Discussives alone; then Maturatives and Suppurating Medicaments are likewise to be administred; such like as have been already propounded in the foregoing Chapter. Or,

Take *Onions roasted under the Embers, the Yelks of Eggs hard boyled, of each three in number; Swines Grease, or unsalted Butter half a pound; the Root of Marsh-mallows boyled to a softness, and bruised very smal one pound; and make a Cataplasm.*

And yet notwithstanding we are not to expect and wait for a perfect Concoction and generation of *Pus*, in regard that *Pus* easily and soon gets a sharp and malignant quality, and so corrodeth the Skul. And therefore so soon as any signs of Suppuration shal appear, the Tumor is maturely to be opened. The Incision is to be either simple and downright, or else it is to be made in the form and figure of a Cross, according to the bigness of the Tumor. The *Pus* being wholly evacuated, the Ulcer is to be throughly cleansed by convenient Medicaments; as for example, with such as this,

Take *Barley Meal two ounces; Myrrh half an ounce; Sarcocol one ounce; Honey as much as will suffice; mingle, &c.*

The Ulcer when it is throughly cleansed is to be filled up with Flesh, and consolidated.

If the bone be corrupted, it is then to be shaven, and to be cured in like manner as it is wont to be in the rottenness of the bones.

But as for the Cure by Chirurgery, it is to be ordained and instituted in like manner as was declared in the Chapter foregoing.

Chap. 37. *Of* Verrucæ *or Warts.*

THere are moreover other Tumors likewise that are said to have their original, not from humors, but from a solid substance. But since that these same humors take their original either from a vitious and luxuriant juyce nourishing the parts, or else from excrementitious humors mingled together with them, we wil therefore subjoyn this kind of Tumors unto those that were but even now explained, and treated of.

Verrucæ.

And first of al, there are indeed certain smal Tumors that arise in the Skin, like unto little hillocks, which are called *Verrucæ* or *Porri*. For with the Latines *Verruca* is properly the higher and more eminent part of a Mountain or Hil, and according to *Gellius* (in his third Book, and Chap. 7.) the rough part thereof; whereupon it is that those places are termed *Verrucosa* that are unequal, and have divers eminent parts. But now these *Verrucæ* from their several forms have gotten divers and several appellations. For one is called *Sessilis* (by the Greeks *Myrmecion*, and by the Latins *Formica*) which is fixed and fastened with deeper roots; broad beneath, and slender above; and this thrusteth forth it self in the Skin less than the other kinds of them; and it is likewise stable and permanent, and not altogether so movable as the rest. Now they conceive that it is so named either from their blackish color (such as there is in Ants or Pismires) or else because that when it is hard pressed, it exhibiteth a sense of pain like unto the bitings of those aforesaid Pismires; and it is for the most part bred in the Hands, or likewise in the Feet; neither is it altogether without pain; and in this there appeareth somtimes a hair or two, and that especially in the face. Another sort of them is called *Pensilis*, because that it hangeth down by a little foot, or as it were by a Harp-string; from whence it is by the Greeks called *Acrochordon*; it hath but a very smal Basis, but a long and great Head.

Verruca sessilis

Verruca Pensilis

This Tumor if it be not of the same color, but that it resembleth the flower of Thyme, and be less, and more unequal, and smal, they then cal it *Thymum*. But now if these *Verrucæ* be greater, they are then (from the resemblance they have with a Fig) called *Ficus*. And hither likewise may *Condylomata* be referred, as also *Cristæ ani*; touching which we have already spoken in the third Book of our Practise, Part 2. Sect. 1. and Chap. 10. where we treated of the Diseases of *Intestinum rectum*, or the straight Gut.

There

Clavus what it is

There is also another kind of *Verruca* like unto the *Sessilis*, which they cal *Clavus*, but the Greeks cal it *Helon*, and we in English a *Corn* or Quern. Those *Verrucæ* are white, round, like unto the heads of Nails; and for the most part they arise in the Toes, and the soles of the Feet, so that they excite and cause great trouble and pain in going. This kind of Tumor *Verruca*, in regard that it hath a dusky or black spot in the midst of the circumference of that Skin, which is likewise of the same color, like unto the *Pupilla* of the Eye, and by means of it resembleth the eye of the Pye, is by the Germans termed *Egsterauge*, which with us is as much as the Eye of that Bird we cal the Magpye.

Now these *Verrucæ* are bred in divers parts of the body; but more frequently in the hands and feet; and for the most part they appear many of them together.

The Causes.

All these Tumors, according unto the vulgar opinion, arise from a matter, thick, melancholick, and flegmatick; the which Nature (when she is no waies able to discuss it) formeth out of it this kind of Tumors.

But *Platerus* (as he did by the former Tumors that were neerly allied unto these) affirmeth that the *Verrucæ* likewise are bred of a juyce that is by Nature destined for the nourishing of the Skin, and the Scarf-skin, after the same manner. As the hardness that yet consisteth in their substance generateth a Callousness, and Cicatrices; even so a part and portion thereof breaking forth into one or more parts of the Skin, adhering unto the Skin, and growing unto the roots, and issuing forth it generateth a very smal portion, filling up the pore, hard, and callous; which one while is carried forth without the pore, as in *Verruca Pensilis*; other while it remaineth stil therein, as in *Verruca Sessilis*, and also in *Clavus* in the feet. But now, that this juyce should thrust it self into the pores, the dilatation and wideness of them may very wel be the cause thereof: which as it proceedeth from divers causes, so in the feet (the skin being in one place hard pressed down, and by this means the pore being widened) the Tumor *Clavus* is easily generated. In the hands likewise, whereas they there also often appear and expose themselves unto the view, *Platerus* conjecturech and conceiveth it to be very credible that these *Verrucæ* proceed from external injuries.

There are some also who determine that these arise likewise from contagion; as if the blood fal out of a *Verruca* (when it is cut) upon some other part, there may then a *Verruca* be generated in that part; and if any one shal use that linen with which the blood that came forth of these *Verrucæ* was taken up and cleansed away; even upon the use and wearing of the said linen *Verrucæ* (that is to say, Warts, and Corns) may succeed and follow thereupon.

Signs Diagnostick.

These *Verrucæ* are easily known from the descriptions already given; and so may also their differences; so that it wil be altogether needless here to deliver any peculiar signs; for indeed these Tumors are vulgarly and sufficiently known.

Prognosticks.

1. *Verrucæ* oftentimes vanish of their own accord, without the help and assistance of any Medicament.

2. *Myrmecia* and *Clavi* notwithstanding, unless they be cured, are scarcely ever known to disappear and vanish.

3. *Acrochordones* are not so hard to be cured, when they have roots that are but smal and slender: but now the rest of them when they are fixed and fastened with a broader root require more forcible and efficacious Medicaments.

4. Acrochordon *if it be cut out, it then leaveth no little root, and therefore indeed it cannot wel return, and arise anew.* Thymium *and* Clavus *being cut out, there ariseth underneath a round smal root, that descendeth very deeply unto the flesh; and so (the root being left behind) it again ariseth.* Myrmecia *stick fast with the most broad roots; and thereupon they cannot indeed be cut forth without some great and dangerous exulceration.* Thus *Celsus* in his fifth Book, and Chap. 28.

The Cure.

Now these *Verrucæ* are taken away either by Medicaments, or by Chirurgery. The Medicaments are such as effect this, either by an occult and secret propriety; or else such as dry up the aliment of them; so that the *Verrucæ* do afterwards wither and vanish away.

Fallopius commendeth the Leaves of the Willow or Sallow Tree, or the juyce of them. But if the green Leaves may not be had, he then maketh use of the pouder of the Willow Leaves, mingled with Vinegar either simple, or Scillitick. They likewise use Figwort, the Roots of Water Dragons, of Cuckowpint, and of Sowbread. They commend also the new and fresh gathered Roots of *Celandine*, with the juyce whereof they anoint the *Verrucæ* or Warts. Others first of al burn them (once and again) with the yong tender sprigs of the aforesaid Celandine, and then afterward they apply Water-cresses and Mustard. There are some likewise who think that these *Verrucæ* may be taken away by a certain specifical propriety that is in Purslain. The *Verrucæ* are likewise taken away, if they be rubbed with Nightshade and Urine, if they be washed with the

liquor that is gathered out of the Leaves of Mullein, and laid thereto with the Flowers of the same, with the Decoction that is made of Mustard, Sulphur, and Salt, with Vinegar; if the Leaves of Savine after they have been for three daies together macerated in Wine be imposed upon them; if Herb Robert, Rue, and Millfoyl, bruised together, be applied. That Cichory likewise which they call *Verrucarium* (the name being given it from *Verrucæ*) is of singular use and benefit; as also the milky Juyce of the stalks of the Herb Lions-Tooth, as likewise of all other Endive and Succory-like Plants; the Water that sweateth out of Vine Branches while they are in burning; the Meal or Flour of Chicheling Pease, as they vulgarly call them.

And for the *Verrucæ* or Warts, and *Clavi* or Corns, in the Feet, this following Emplaster is like wise very efficacious.

Take Ship-pitch one ounce, Galbanum dissolved in Vinegar half an ounce, Sal. Ammoniac. one scruple, the great Diachylon Plaister one ounce and half, mingle and make an Emplaster.

But if these and such like avail not, we must then betake our selves to those Remedies that are stronger, and such like as have in them a Caustick virtue, yea even unto the actual fire it self; and yet notwithstanding Caustick Remedies are not to be administred without a great deal of caution (especially in the Nervous or sinewy places) and so, that they may only touch upon the *Verrucæ*; and therefore the part that lieth round about is first of all to be wel guarded with Wax, or some kind of Emplaster.

For this end and purpose there is usually administred the Milk of Figs, and Spurge or Milkwort; and that indeed the Milk of the aforesaid *Tithymal* or Spurge is in it self alone very efficacious, *Valescus de Taranta* writeth that it is so found to be by experience. Unslaked Lime mingled with Sope is also profitable; which said Medicament will be the more effectual, if there be added a little calcined Vitriol, or Verdigrease, or a Cautery prepared of Sope Lye. Or,

Take the white of an Egg hardened in boyling, Verdigrease and Allum, of each one dram; mingle &c. Or,

Take Green Garlick, and when it is newly bruised let it be applied to the *Verruca*, and let there be a little Cap of Wax imposed thereon, and wrapt about with a Swath, to keep it fast on. Or,

Take Orpiment, and let it be mingled with Oxymel, or the Milk of the aforesaid Milkwort or Spurge, and let it be put upon the *Verrucæ*. Very useful likewise is the Oyl of Vitriol and Sulphur. And *Johannes Andreas a Cruce* doth here indeed in a wonderful manner commend the Oyl of Vitriol; and in this manner he applieth it. He provideth a little Knife of Lign-aloes, or the like, and this he dippeth in the Oyl of Vitriol, and by this means he freeth the *Verruca*; with which otherwise it is freed by an Iron Penknife.

The Chirurgery by which *Verucccæ* are taken away is described by *Galen*, in his fourteenth Book of the Method of Physick, Chap. 17. by *Paulus Ægineta* in his sixth Book, Chap. 87. and by *Rhases*, in his Book of Divisions, Chap. 124. And it is performed either by extraction, or excision, or else by adustion. They are extracted and pluckt forth with a Quill; the Circle whereof let it be equal unto the *Verrucæ*; with this Quil let the *Verrucæ* be on all sides streightened and hard bound; and then afterward let the *Verruca* be loosned and drawn round about, and so by this means it may together with its root be pulled forth. The same is likewise performed by the Silver Pipe. There was one at *Rome* that usually pluckt them forth by sucking, and his Teeth together, as *Galen* in the place alleadged informeth us.

They are cut off, either by something tied about them (to wit, the *Verrucæ Pensiles*) as for instance, by a silken Thred, or some other Thred that is strong, or else by a Horse Hair, still by degrees streightning and drawing close together the bond, until the *Verrucæ* fall off. And if there remain behind any of its Root, it is to be wasted and consumed by a Cautery. Or else it is to be performed by an Iron, or fitting Pen-knife, so that the *Verrucæ* must first of all be scarified round about; and afterward let it be cut off with a sharp Penknife, and with the Phlebotomy Instrument quite grub'd up by the Roots.

They are actually burnt, either by a little stick of the Beech Tree, lighted at one end; or else by a long sharp Iron Bodkin, heated red hot, and applied to the *Verruca* through a smal Cane, that so the neer adjacent parts may not be hurt or offended. Or if a thin Iron plate having a hole bored through it according to the bigness of the *Verruca*, be so applied unto the said *Verruca*, that the *Verruca* alone appear through the hole, and then afterward it may be burnt with a red hot Iron, or with the flame of Fire. The burning being performed and ended, the Escar is then to be taken away, and the Ulcer to be healed in a fit and convenient manner. *Fallopius* (if other Remedies be not sufficiently prevalent) burneth the *Verruca* with Sulphur, after this manner. He taketh the middle shel of a Walnut, and boreth it through according to the bigness of the *Verruca* or Wart, and so applieth the convex part thereof unto the place in which the Wart appeareth, so that it may strictly and closely comprehend the *Verruca* or Wart, and that the *Verruca* may appear forth through the hole into the Cavity or hollow part of the shel. After this he puts in Sulphur into the hollow of the shel, and kindleth it; which being melted, and kindled, the *Verruca* is so long to be burnt as the Patient can wel endure it; and if it cannot at once doing this be wholly extirpated,

extirpated, the aduſtion is to be repeated three or four times, in the manner aforeſaid. When the place ſhal be healed, it is then for ſome daies to be rubbed with the Leaves of Sallow, and ſo covered therewith that the *Verruca* may no more return, and ariſe anew.

Touching *Thymia*, and *Criſtæ ani*, we have already ſpoken in the third Book of our Practice, Part 2. Sect. 1. Chap. 10.

Chap. 38. *Of* Cornua.

VEry many there are that refer *Cornua* unto the aforeſaid *Verrucæ*: and they determine that they are a certain longer kind of *Verrucæ*, and ſomwhat crooked like unto a Horn. But this name is both by the Arabian Phyſitians, and thoſe of theſe latter times likewiſe extended far wider. *Avicen* in the ſeventh of his fourth Book, Tract. 3. Chap. 14. writeth thus touching theſe *Cornua*. *Cornua* (ſaith he) *are thick additions, crooked, ariſing above upon the Junctures, in the extremities, by reaſon of the vehemency of their operation; and the cure of them is Inciſion, that ſo that which is altogether inſenſible and without pain may be removed out of them; moreover let there be adminiſtred upon the reſidue thereof Medicaments that are vehemently ſharp and acute (out of thoſe Medicaments that are made uſe of in the* Verrucæ) *until it fal; and then let Butter boyled be adminiſtred and applied thereunto.*

Avenzoar in his ſecond Book, and Chap. 5. hath ſomthing to this purpoſe: *I have heard* (ſaith he) *my Father ſay, that he once ſaw a certain man that had bred in his back a bone like unto the Unicorns Horn, but it was leſs hard than a Natural bone. And my Father purged away the groſs humors that were in this man, and afterward he put exſiccative Medicines upon the bone; upon which the ſaid bone fel forth like as the Harts Horns ſhed and fall off in the Spring. And I my ſelf likewiſe had once a bone growing upon my back, which brought upon me much grief and pain: I then purged my ſelf from groſs humors, and I put upon the aforeſaid bone Reſolutives; ſo that it was for the greateſt part reſolved; and that little remainder thereof was no hinderance at all unto me in the exerciſe of my natural operations. Therefore whenſoever thou find the like, do as I have ſaid. And when thou purgeſt them, do not purge them only with the virtues of Medicines, but even with the very proper Medicines themſelves. And in the number of the better Minerals (for the purging of theſe) the* Lapis Lazuli *is one; but without all doubt there is great help to be had from the Load-ſtone, in this caſe: but for my own part I make little or no uſe of the Load-ſtone in my practice, in regard that the* Lapis Lazuli *ſufficeth me; and I commend unto you the operation thereof.*

But yet ſome there be of the latter Writers that reckon up theſe *Cornua* among the Affects of the Head; touching which *Lanfracus* (in his Tract. 3. Doct. 2. and Chap. 3.) thus writeth: *I have likewiſe ſeen* (ſaith he) *manifeſt eminencies of the Skul, like unto Horns. For I once ſaw a man that came unto me for advice that had in his Head ſeven eminencies, one greater than the other, and they were in divers places. Of which one was as big and acute as the Horn of a Kid, a finger long, or as long as ones thumb, and it much hurt and annoyed the Skin: and I admired that the Skin was not exulcerated. When therefore I ſaw that it had its original and root from the head, I would by no means be perſwaded to undertake the Cure, but rather perſwaded the ſick perſon that he ſhould put himſelf into no mans hands, in hope of Cure, for that it ſeemed unto me altogether impoſſible.* But *Johannes Philippus Ingraſſias*, in his firſt Tract of Tumors, and Chap. 1. relateth that he ſaw at *Panormus* a certain Noble Virgin (a Girl) that was afflicted with very many of theſe crooked excreſcencies, that were withal ſharpened in the top of them, like unto Calves Horns, almoſt in al the Limbs, and eſpecially in the Joynts of the Hands, the Arms, and the Knees, as alſo in the Head, and the Forehead. *But yet notwithſtanding* (ſaith he) *thoſe Tumors were not bred in the Skin, but upon it, and that indeed in a certain new order of generation. For like as the generation of the ſtone happeneth in the bladder, to wit, that one Tunicle as it were coming upon another, it encreaſeth unto a greatneſs; ſo in like manner we beheld in them very many (as it were) boney cruſts ſticking the one to the other, juſt in ſuch a faſhion alſo as if we ſhould put the half rinds of Filberds one upon another, the leſs ſtill upon the greater, that ſo they may be joyned together in an acute and ſharp form, and the ſhape of a Pyramid. But theſe when they were touched about the baſis and bottom of them, were extreamly painful; and they ſtuck ſo faſt in, and were of ſuch an extraordinary hardneſs that no Phyſitian being able by any kind of Remedies whatſoever to yield the Patient any help or relief, her kinred at the length (after that the Diſeaſe, and the growth of theſe* Cornua *had for many yeers continued) came unto me. For they were continually augmented both in their bigneſs, and (divers other new ones budding forth) in their number alſo: whom (by the gracious aſſiſtance of Almighty God) we recovered unto her former health and ſoundneſs, and alſo unto her former beauty, and comely feature. Who notwithſtanding was become ſo deformed and miſ ſhapen, that ſhe was now become more like an ugly Monſter, and frightful Devil, than to any Woman kind; inſomuch that her Parents much rather deſired her death than her life.*

Julius

Julius Cæsar Scaliger in his 199. Exercitat. Sect. 5. writeth, That for the growing of these *Cornua* upon men and women (making them like unto Monsters rather than unto what indeed they are) although he was told thereof by Prince *Aboalis*, and by that person of note *Abumeron*; yet notwithstanding their great Authority and credit, he could not beleeve a thing so strange, until he himself saw one of them on the back of a certain Rower, that had been for a long time in the *Triremis* (a long Boat with three Oars so called) of the *Ligurians*.

Alexander Benedictus in the first Book of his Anatomy, and 14. Chap. telleth us, that in *Crete* he saw a black horn most like unto the head of a wild Goat growing forth in a mans Knee that was wounded by an Arrow; and that the matter that ought to have been converted into the substance of a bone was easily (by the blowing in of the Air) turned into an horney Nature, and soon got unto it self an hardness, after the manner of Gums.

And *Fallopius* in his Book of the similar parts, Chap. 7. writeth, That sometimes likewise in whol bones as wel as in fractures there may be something bred like unto a horn; and that this same horn may grow forth without the flesh and the skin; and that he himself saw this at *Padua* in the thigh of a certain noble man; out of whose thigh there grew forth as it were a little long stake or post.

Zacutus his observation touching Cornu bred in the heel.

Zacutus in his second Book of the Administration of Practical Physick, Observ. 188. relateth that a certain poor man naturally melancholick, long complained of a pain he had in the heel of his right foot; and that he there felt a certain hardness, that afterward grew forth into a Tumor of the bigness of a smal Chesnut, hard, rough, and leaden colored; which in eight months time so encreased that it was become an hand breadth long, and resembled a true horn. Which after it had been cut off (by the advice of Physitians) no symptoms following thereupon, and the body purged twice every yeer, he lived for two yeers in sound and perfect health. But after this he suddenly grew sensible of extream and intollerable pain in the very same place, and in six months the *Cornu* grew forth again, hard, and encompassed about with most sharp pricks, and was in length at least one hand breadth and an half. The which being again cut, in the very bottom thereof there was left a little hollow place, out of which there flowed forth great store of a black stinking humor, of so corroding a nature, that it soon eat through the flesh neer unto it. We then indeed purged his body with Medicaments that were fit and proper for the evacuation of the melancholy humor; and there were likewise Sudorificks of the China Root administred; but al to no purpose. And therefore to intercept the flux there were several Issues made, one in the Leg that was sound, four fingers below the Knee in the external part; another in the Leg affected eight fingers above the Knee, or else in the Thigh in the inside thereof. He was every month purged; and so by this means the *Cornu* was hindered from growing again any more; and the Ulcer was healed of its own accord, and covered over with a Cicatrice.

Nodi.

And hither (without al question) belong and are to be referred the *Nodi* of *Platerus*, (touching which we spake above in the thirty fourth Chapter:) which are the hardest sort of Tumors, sticking firm and fast in the bones that lie under them, and which cannot be made to remove their place from the said bones; as if some new bone were now grown unto the former; which kind of Tumors are bred about the Temples, and the Forehead, and also about the length of the Ankles, in those naked Regions. And these Tumors either begin of themselves, or else they accompany other Diseases, as the French Pox, and one certain kind of the *Cephalæa* Affect.

The Cure.

These *Cornua* and *Nodi* are very hard to cure; and they often continue al the whol life time. And yet notwithstanding if they be neer unto the Joynts, so that they hinder the motion of them, or if they cause continual pain by pressing upon them, they are then to be amputated and cut off; which may be done the more safely in regard that they consist in the naked bones that are only covered with the skin. The skin is first of al to be opened, and the *Cornu* or *Nodus* to be made naked and bare; and after that it is to be cut away from the bone with a sharp Iron Knife, and the Wound to be cured in a fit and convenient manner.

Chap. 39. *Of* Fungi.

THat Affect which the Latines cal *Fungus*, the Arabians cal *Fater* and *Fatera*, and they refer them unto the Tumors of the Brain. *Galen* by the way and cursorily maketh mention hereof, when in his first Book of the place affected, Chap. 1. he thus writeth: *And now* (saith he) *even likewise of those things that spring up and grow unto other things, the notes and marks of the place or seat affected are to be sought for. For why, such things as adhere and cleave unto others obtain the propriety of Essence, like as do* Fungi (*which the Greeks cal* Mycetes) *if upon the breaking of the Head the Meninx or Membrane chance to be broken.* *Avicen* likewise maketh mention hereof, in the fifth of his fourth Book, Tract. 3. Chap. 2. where he saith thus: *And when the* Cranium *or Skull is broken, and the Vail or covering goeth forth, there is then also caused*

caused an Impostume that is named Fatera. And we treated of this Tumor in the first Book of our Practice, Part 1. Chap. 25. But (as sometimes we wrote unto that eminent and worthy man *Gulielmus Fabricius*, as is to be seen in the second Century of his Observations, Observat. 25.) this kind of Tumor as indeed it may arise very frequently from the Membranes of the Brain, so it may also be bred in other parts; as you may there find two Histories by me produced, for the further confirmation thereof. The former whereof is this. A certain Youth there was about ten yeers old, that in leaping hit his left foot hard against the ground, and by this vehement stroke he hurt the sole thereof over against the little toe. Upon this a Tumor began by little and little to increase, insomuch that it had soon gotten over al the foot, and exceedingly distended the skin; so that the toes (by reason of the tumor or swelling coming betwixt) stood at too great a distance the one from the other. And yet notwithstanding the skin in color was like unto the sound part. There were by divers Physicians (as the manner is) divers means attempted, and different Remedies put in practice, but al in vain. At length his Friends went unto a Chirurgeon for his assistance, who when he saw the place very soft, and found that the pain encreased, conceived that there was now already a suppuration made, and thereupon without any more ado he opened the place, out of which there issued forth a little blood, but no *Pus* at al. And in a short time after there ran forth as it were a certain kind of fatness, by the which the Wound was quite shut up. Within a few daies following there began to break forth these *Fungi* in great abundance, ful of black wheyish blood. And in the sole of the foot neer unto the little toe one night there happened as it were a benummedness and deadness as large and broad as half a Rix Doller. This being opened, yet notwithstanding there sel forth no putrid and corrupt matter; neither could any of the dead flesh be separated, but the flesh was in appearance like unto a burnt spunge, al bloody, swelling and strutting with blood, and destilling it. They began likewise to shew themselves in other places, to wit, at the sides of the foot, and above the ankles; most loathsom and frightful to look upon; insomuch that that part of the foot did equal (or indeed exceed) in bigness a childs head. At length he proceeded to Section, and the middle part of the foot, even to the Navicular bone, and the heel bone, was cut off. That which was thus cut off was wholly a hollow spungy flesh, partly putrid and corrupt, and partly curdled, thick, and like unto a clammy porous fatness, and weighing wel neer four pound. But on the following daies a Spungy flesh brake forth again with great violence; and look how much there was taken away in the day-time, there grew again as much in the night. And lastly, there arose a great swelling in the Thigh (nigh unto the left Groyn, in the place where the Glandules are) in shape much resembling that which at first was seen to appear in the midst of the foot; which afterward brake of its own accord; out of which there grew forth great store of spungy flesh. And so not long after the Boy died.

A History

The other History is this. A Boy twelve yeers old was greatly troubled with the pain of his teeth. At length it came to this, That they must be drawn. One of the upper teeth is accordingly drawn forth. Upon which there afterward arose a Tubercle in the Palate neer unto that Tooth, as big as a Prune stone. This being soft, and not opening of its own accord, it was conceived that there lay some *Pus* or purulent matter under it; whereupon it was opened, and at first there flowed forth nothing but some few drops of blood: but then afterward there brake forth a spungy and blackish flesh, which so far encreased, that it did not alone hang forth at the mouth, but grew forth likewise by the Nostrils, and at length brought death upon the Child.

Another History.

And *Gulielmus Fabricius* in his second Century, Observ. 199. relateth likewise an History of a *Fungus* that had its original from *Gurgulio*, that wholly filled up the Palate, and reached welnigh unto the fore teeth. And another he mentioneth in the following Observation, that arising from *Gurgulio* was altogether as big as an Hen Egg, and it so stopped up the little holes of the Nostrils that end in the Palate, that the sick party could hardly breathe; neither could he speak distinctly, and so as to be understood.

This *Gulielmus Fabricius* in his third Century, and Observat. 1. tels us yet likewise of another *Fungus* that he had seen growing out of the Ear, and that he cured the same. And in his fifth Century, and Observat. 62. he mentioneth yet another *Fungus* that sprung and was bred out of the very Center of the Navel. This kind of Tumor *Gulielmus Fabricius* in his third Century, Observat. 36. conceiveth, that it is to be referred unto those that we cal *Nattæ* or *Naptæ*. But what these *Naptæ* are, we have before declared in the thirty sixth Chapter. And although there be something of *Fungus* contained in the aforesaid Tumor *Natta*; and albeit these Tumors may in the general be said to be *Fungus*: yet notwithstanding that is covered over with the skin; but *Fungi* properly so called (and of which we are now treating) hang forth al naked and bare without the skin, and there they grow and encrease. And therefore likewise they breed not in the whol and sound Membranes of the brain, but they are bred in them when they are wounded, bruised together, and hurt.

The subject of these Tumors is a Membrane, that is any waies hurt, or wounded, or bruised.

The

The Causes.

Johannes Philippus Ingrassias (touching the Cause, and the manner of generation of these *Fungi*) writeth that this *Fungus* is wont to be bred in like manner as in Candles lighted or Lamps we see the *Fungus* (in the Winter time especially) that is wont to arise and appear in the top of the Wick of the one, and the match of the other; and which is with weak and simple Women a notable presage of Rain suddenly to follow; even as *Virgil* (in the first of his Georgicks) and *Pliny* likewise in his eighteenth Book about the end thereof, do both of them attest. For when the Air begins to be moist, the sparkles that were wont to pass forth with the smoke, being now prohibited and hindred, by reason of the thickness of the Air, do there reside in the Lights, and there they represent as it were certain resemblances and Images of *Fungi*. And just so it is in the Membrane of the Brain, when it is discovered and laid open, at the first there is a certain substance that representeth the likeness of that soft and Cotton-like tender Hair that is found upon the heads of new born Infants. But then afterwards the vapors being discussed by exhaling, and the Fumes being made to assume a round form in that substance by the coldness of the Air, they are by little and little burnt and extreamly dried by the more inward heat, until at length there appear also a substance like unto the said *Fungus*, signifying that the Membrane is altered by the Air.

But in very truth, it is indeed to be granted, that these kind of *Fungi* are generated from a superfluous humor, as it were sweating forth thorow the hurt Membranes; but that this matter may be even detained there by the coldness of the Air, and that it may likewise be there exsiccated meerly and only by the heat, is altogether false, and therefore not to be granted. For these *Fungi* cannot possibly be so suddenly generated after this manner, and get such a growth. But it is most agreeable unto truth, that the humor destilling forth into the soft Flesh (that is spungy like to the Mushrom in Trees) is changed by the formative faculty of the part; and that Nature which is never idle doth change and form into this substance the humors flowing thereunto, which by reason of their abundance (as likewise their unfitness for motion) and the debility of the part, it can by no means possibly convert into the aliment and substance of the said part.

Signs Diagnostick.

This kind of Tumor is very easily known. For out of a Membrane hurt and bruised, or wounded, there shoots forth a soft Flesh, spungy, and pale, and not covered with the Skin; and suddenly it attaineth unto a great and extraordinary growth.

Prognostick.

This Malady is very dangerous, and hard to be cured; and if it be not handled aright, it easily turneth into the Nature of a *Cancer*.

The Cure.

Universals having been first premised (the which it is not our purpose here to mention) the *Fungus* it self is to be taken away, which is done either by Medicaments that exsiccate, and corrode, or else by excision and cutting it our.

Medicaments that exsiccate and dry are far more safe then those that corrode and eat through: in regard that by Corrosives the matter is easily exasperated, and so obtaineth the nature of a *Cancer*. Now such are made of round Aristolochy, the roots of it, and of the Florentine Flower-de-luce, Angelica, the true and right *Acoruss*, the Leaves of Savine, of Card. Benedict. of Rosemary, of Plantane, Horstail, Storks bil, the Flowers of Red Roses, Mastick, Frankincense, Myrrh, prepared Tutty, burnt Lead, Sugar of Saturn, *Lapis Calaminaris*, the Ashes of Froggs and Sea-Crabs.

But they are to be cut out either by a Silken Thread (tying it about therewith) or else any other strong Thread; otherwise it is done by an Iron. So soon as the *Fungus* is taken away either by the aforesaid Ligature, or Iron, then there ought to be strewed and sprinkled thereupon Powders of the before mentioned Medicaments. As touching these operations, see further in *Gulielm. Fabricius* in the place alleadged; to wit, Century 3. Observat. 1. and Century 5. Observat. 62.

Chap. 40. *Of Tumors Malignant and Poysonous, and in special of* Elephantiasis.

WE are at length come to treat of a certain kind of Tumors arising from the humors, that have joyned with them a Malignity. Among the which the first we meet withall are the smal Pox and Measils. But because we have already handled them in the fourth Book of Feavers, Chap. 12. we shal here add no more as touching them; but rather refer the Reader thither, for his further information. And then the next we meet withall are those we call *Bubones* and pestilent Carbuncles; touching which we shall likewise here in this place spare our pains in the further treating thereof, in regard that we have also spoken of them in the place alleadged, to wit, the sixth Chapter. There likewise belong hither (in the third place) those Tumors that we term Venereal, of which we shall hereafter treat further in its proper place, among the malignant Tumors

mors. And lastly, there is this *Elephantiasis*, touching which alone we intend here to discourse.

That Affect which the *Arabians* call *Lepra*, we have told you above (in Chap. 28.) that it is by the Greeks called *Elephantiasis*. Now it is called *Elephas*, *Elephantiasis*, and *Elephantia* from the Elephant; by reason of the likeness and resemblance that this Disease hath with that Creature (the Elephant) to wit, as some conceive, because such as are affected with this Disease become great as the Elephants; but this is but a weak and simple conjecture of theirs, since that those who are affected with the *Elephantiasis* are not made hereby ever a whit the greater (unless haply we have respect not so much unto the greatness of the body in such as are thus affected, as unto the greatness of the danger of death thereby threatned; to wit, that look as the Elephant is the greatest of al the four-footed Creatures; even so among diseases this appeareth to be the greatest, and an Affect almost remediless and incurable) touching which thing *Macer* in his Book of the virtues of Herbs, and Chap. 15. speaketh unto the same purpose.

Elephantiasis.

Or else this Malady is so called, because that creeping along upon the Thighs it causeth them to become (as are those of an Elephant) rough and unequal: or else because that among other Diseases this is exceeding vehement, strong and violent, like as is the Elephant; or otherwise it is so called (and this indeed seemeth to be the most true and genuine reason thereof) because the members & the skin of those that are affected with this Disease are rendered tumid and swoln, scaly, rough and rugged, ful of swellings, and unequal, like unto the skin of Elephants. *Galen* in his Book of Tumors, Chap. 14. writeth that this Malady when is first beginneth, is likewise called *Satyriasmus*, in regard that the face of those that are afflicted with this Disease is rendered like unto the face of the said Satyres. For the lips of such as are troubled with *Elephantiasis* are thereby made thick, and the Nose swelleth; and thereupon it seemeth as if it were pressed down; the Ears become flaggy and much wasted, the Jaw bones are colored, as it were, and overspread with a certain kind of redness, and in the Forehead there appear here and there Tumors or Swellings, like as if they were certain Horns: although there be others indeed that think the *Satyriasmus* to be so called, even for this very cause, that in the beginning of this Malady the sick parties are extreamly libidinous and lustful, like as are the said Satyres. And yet notwithstanding *Aetius* in Tetrab. 4. Serm. 1. Chap. 120. out of *Archigenes*, rendereth another kind of reason of this resemblance (and that indeed different from the former) to wit, because the Cheeks and face in such as are thus affected are lifted up, together with a certain redness, and the Chin it self is dilated, upon the Convulsion as it were of the Muscles of the Jaws; even as we see it likewise to befal those that laugh, in a certain kind of likeness and resemblance unto the Pictures of Satyres; which *Cœlius Rhodiginus* in his 19. Book of the reading of Antiquities, and Chap. 25. conceiveth to be so called from the Greek word *Seserenai*, because that these Satyres sing and sport themselves with their mouths wide open and gaping, and their lips drawn forth like unto those that laugh. And there are some that give us a third reason and ground of this appellation, to wit, because that those who are affected with this *Elephantiasis* are like unto Satyres in their propension unto Venery, and lustfulness.

It is likewise termed *Leontiasis*, either in regard that this Malady is invincible, like as the Lyon; or else because (as *Aetius* hath it in Tetrab. 4. Serm. 1. Chap. 30.) the forehead of the sick person is with a certain swelling rendered and made more loose, after the resemblance of the flexile skin of the Lions Eye-brows; or else, because the breath and the very spirits of such as are affected with this Malady do even stink like unto the breathing of Lions, and their very excrements also; or else because those that are affected with this Disease have a most filthy and terrible face, insomuch that (like as do Lions) they strike a terror into those that come suddenly and unawares to behold it. This Malady is by our Physitians called the Malady of St. *Lazarus*; because that such as are Elephantiack do so abound and are ful of Ulcers, like as was that *Lazarus* the beggar, of whom there is mention made in the Evangelical History, *Luke*, Chap. 16.

Now this is a very sad and grievous Malady, and as it were an Universal, or Cancer of the whol body; whereupon it comprehendeth under it many more sorts and kinds of Diseases. For first of al, there is present magnitude augmented, and a swelling up and down in the body, especially in the external parts, whose beauty, feature, and figure likewise is hereupon corrupted: there is likewise present a hot and dry distemper, by which the parts are so exulcerated and corrupted that at length they fal off. *Celsus* in his third Book, and Chap. 25. thus describeth the whol Idea of this Malady: *The whol Body* (saith he) *is affected, so that the very Bones likewise may in a manner be said to be vitiated and corrupted. The highest and utmost parts of the body have in them both spots and swellings that stand thick and close one by the other. The redness of these parts is by little and little converted into a black color. The top of the skin is unequally both thick and thin, hard and soft, and is exasperated by certain scales; the body waxeth lean; the mouth, the calves of the legs, and the feet swel, and are puffed up. When the disease comes once to be old, the fingers and toes are quite hidden under the swelling;*

swelling; there ariseth also a light and gentle Feaver, that easily consumeth and wasteth the sick person, that is already overwhelmed with the aforesaid evils and mischiefs.

The Causes.

The containing cause is black Choler (and this not without malignity) diffused and spread abroad throughout the whol body. Now we find touching the generating of this humor, viz. black choler, a long and tedious dispute among Authors; and we find them holding divers and different Opinions. In this (the truth is) they al agree, that this humor is generated from the aduction and burning of other humors; but then in this they differ, viz. from the aduction of what humors this proceedeth. *Avicen* in the third Section of his fourth Book, Tract. 3. Chap. 1. seemeth to have comprehended them all; whiles he mentioneth five Species or kinds of this humor. The first is that which proceedeth from the Blood; the second that from the melancholly humor; the third that which is from the aduction of bitter Choler; the fourth that which ariseth from Flegm burnt; the fift and last, that that proceedeth from the thick, and hot part (as being very apt to be burnt) of the Chyle, as to Instance, from all salt Flesh, Fish, and the like. But although it cannot be denied, that there is here in this case an aduction of humors present, and that salt humors are the cause of this Malady; yet notwithstanding, since that there are very many other Tumors and Ulcers that have their original from adust humors, here therefore the very specifical cause is altogether to be sought for, which notwithstanding cannot easily be explained; but it consisteth in an occult *i. e.* an hidden and secret Malignity. But now this humor is diffused thorowout all the Veins; and an inductive Feaver is dispersed (without any putridness at all) thorowout the whol body, and is mingled together with the aliment.

But now there are many things that conduce and make to the generation of this humor. There are some thar contract the original seeds of this Malady from their very birth; to wit, such as either are born of Elephantiack Parents, or else conceived during the Flux of the monthly Courses, vitious, and corrupt, and declining unto black Choler. And moreover also the hot and dry distemper of the Members destin'd by Nature for Nutrition (as for example, the Liver, and the Spleen; from whence it is that the Blood and the humors are burnt) is deservedly reckoned up and accounted among the Causes of this Malady. And furthermore, the frequent and common use of salt meats maketh likewise very much hereunto, as also the eating of sharp and sowr meats, and food that is overgross and thick: the Air also being overhot and dry; or else thick and Cloudy: from wheuce it is that this Malady is in some Countries more frequent and usual, and in other Regions scarcely known; as the Poet *Lucretius* tels us in his sixth Book: *Elephas* (saith he) *is a Disease that* (*by reason of the overflowings of the River* Nilus) *is bred in the midst of* Egypt, *and no where else.*

But although it be true that the Disease is more frequently found there; as *Galen* likewise testifieth in his second Book to *Glauco*, and Chap. 10. (where he acknowledgeth that in *Alexandria* by reason of the fervent heat of that Region, and the unfitting Diet of the Inhabitants, who eat Meal boyled, Lentiles, and Cockles, many salt meats, and the flesh of Asses, with divers other sorts of food that generate and breed a thick melancholly humor, there are more that are troubled with this *Elephantiack* Disease) yet notwithstanding it is also to be found in other Regions. In *Germany* (especially in some parts thereof) these Elephantiack Persons are very common and ordinary; but in *Spain* and *Africa* they are far more frequently found; and in *Gallia Narbonensis*, and *Aquitain*, there are more of them to be found then in al *France* besides. *Pliny* in his twenty seventh Book, and Chap. 1. writeth, that before the time of *Pompey* the *Elephantiasis* was never known to happen in *Italy*. Living and Conversing likewise with the Elephantiack Persons much conduceth to the causing of the Disease. For the Air (that in breathing is attracted and drawn in) is infected by the stench of the Members, and the vitiated exhalation of the Breath. From whence it is that men deservedly shun the company of those that are thus affected; and for such as are domestick, and therefore necessarily constrained to abide under the same Roof, do yet (as there is good reason for it) shun their company, and all neer Converse with the sick Persons; and therefore even for this cause it is that these Elephantiack Persons are separated from the society and company of others; and are sent away, and disposed of in some open places, in the which they live with most benefit unto themselves, and less endangering others. But especially carnal copulation with the Leprous man or Woman is undoubtedly dangerous and infectious; and so is likewise that carnal society that any one hath with her that before hath had to do with a Leprous man. Unto these same Causes there belongeth also the retention of the Melancholly Excretions; as the suppression of the monthly Courses, and the Hæmorrhoids, and the sudden stanching and drying up of long continued Ulcers. For such a like humor as this (if it be detained long in the Body) becometh worse and worse dayly, and at length acquireth this malignity, and being retained in the Body it feateth and setleth it self in the Veins, and infecteth the whol mass of Blood. Moreover this Malady doth more frequently invade and seiz upon men then women; and among men, those especially that have in them

them Blood that is thick and viscous, tending to black Choler; and such as use a thick and inordinate kind of Diet.

Signs Diagnostick.

Although (as for what belongs to the signs of this Malady) we have given you some few of them out of *Celsus*, as they are by him recounted and reckoned up; yet notwithstanding it wil not be time & pains ill spent to enumerate and declare the whol entire History of the Signs and Symptoms. And therefore in the first place, whensoever this Malady is nigh at hand, there immediately goeth before it, and is present, a sluggishness or slothfulness, and slow and difficult breathing, unfitness for motion, a dayly and continual costiveness of the Belly, Urines like unto the stalings and waters that come from Beasts and the greater Cattel, a Breath slow and stinking, and an extream propension to Venery. When the Malady hath once gotten forward into the Skin, then the Native and flourishing fresh colour of the Face is changed, there arise red blewish and wan Pustules, the Cheeks and the Chin become thicker, the Veins under the Tongue are swollen up, and wax black, the Hairs fall off, there is present an extraordinary Thirst, and a drineſs in the mouth both by Day and by Night.

But now as it is in other Diseases, so it is here, that there are likewise certain times of this Malady. The beginning is, when the vitious humor and the malignity is yet but as it were laying siege and beleaguering the Bowels. The increment or increase, when the Malady now shews it self abroad and openly, and that the Symptoms are daily augmented. The state, when the Members are exasperated, and the whol concourse of the symptoms appeareth publickly, the which we shal immediately subjoyn. First of all the Eyes appear exactly round, and the looks thereof are fixed and immovable; which happeneth by reason of the consumption of the fat, and the extenuation of the Muscles; the Eye-lids and the Ears are contracted and drawn together; the Eye-brows fall down, the Nose swelleth outwardly, and is made flat, by reason of the afflux of the humor, and it is streightened within; from whence it is that the passage is obstructed, and the breathing hindred, so that they seem to speak as it were through their Noses; the colour of the Face is wan and Leaden coloured; the aspect and looks frightful; there appear Tubercles and red Pustules under the Eye-brows, about the Ears, and in divers places of the Face, and knots hard and round, like unto Grains; the Lips are made thick, the Bones neer unto the Ears stick forth; the Hairs of the Head shed and fall away; and if the Hair be pulled forth, a part likewise of the white Skin is pulled away together with it; which is a most certain and infallible sign of the Leprosie. This Malady discovereth it self likewise in other parts: the Veins under the Tongue swel, and become blackish; and the Glandules that lie neer unto the Tongue (and round about it) have in them round Tumors, like unto the *Scrofulæ* that are in Swine, which we call the Swine pox. The Breath stinketh, the Voice is hoarse, shril, and obscure, by reason that the Lungs and the parts serving for Respiration are filled and beset about with thick & adust humors, and by reason also of the drineſs and roughness of the *Trachæa Arteria*, or the great rough Artery. In the Hands the Muscles are extenuated, especially between the Thumb and the fore Finger; for whereas those Muscles are naturally lifted up into an hilly and manifest swelling, the depression of them and their being emaciated (happening by reason of the defect of aliment) becomes the more manifest and remarkable in them; the Nails are cleft; there is present a stupidity, and want of feeling in the Ankles, and the Calves of the Legs, and in the Feet also; so that although the sick Persons shall be pricked with Pins or Needles in those places yet they feel it not, in regard of the vitious matter filling up and obstructing the part & hindering the access of the spirits. The same likewise sometimes befalleth the Fingers and Toes, in the which there is also perceived a coldness and a certain privation of al sense and feeling; and sometimes likewise that stupidity and sleeping (as they cal it) chanceth unto the whol Skin between those Fingers, and extendeth it self even unto the Arm; & from the Foot it extendeth it self even unto the Knees, the Thighs, and the Hips; yea moreover the sense of feeling is diminished throughout the whol body in Elephantiack Persons. For all the Nerves and Pores being obstructed and in a manner shut up by the thickness of the humors will not allow and afford any passage unto the Animal Spirits. In some certain places under the Skin there is perceived and felt a kind of stinging (such as is caused by Emmets or Pismires) as if Nettles were rubbed thereupon; and likewise a certain kind of itching and tickling, as if there were Worms creeping there, and this is by reason of the adust fumes and burnt vapors ascending up under the Skin. The Skin it self is wholly Unctuous and Oyly (so that Water poured upon it wil hardly stick and abide) by reason of the melting of the fat under the Skin, and the effusion of fat excrements thereinto. Others there are that unto these signs add other signs also. They advise us to take some few grains of Salt, and to cast it upon the Blood; because that if the Blood be infected the Salt is presently resolved and melted; but on the contrary, if the Blood be not infected. They command us likewise to cast this Blood into the purest and cleerest Water; and if it swim at top, it is corrupted; but the contrary if it sink to the bottom. Others there be that take the Blood and putting it in a clean Linen Cloth they wash it;

for if there then appear in it certain blackish, rough, and as it were sandy bodies, it argueth a leprosie. But there are other signs also of this Malady; and indeed there is scarcely any evil, mischief, or inconvenience, that is not annexed thereunto; and in the which there is hardly any thing within or without that is sound. But yet notwithstanding the Face is especially to be considered; neither is any one rashly to be accounted Leprous, unless the figure of the Face be corrupted. And therefore since that in some Common-wealths there is instituted and appointed an Annual Examination and Search in and about these Elephantiack persons, and that this is the chief, if not the whol business of the Physician; he ought therefore to use the utmost of his endeavor, and to be very cautious, that through imprudence, or by a rash and precipitate Judgment he do not cause such to be exiled and banished from al society that are not infected with this Disease; and on the other hand, for those that are infected therewith, that he do not permit them to live and converse with such as are sound, to the great endangering of them. And this he may easily do, if he have in his eye al the signs before recounted and mentioned; and if he wil likewise but duly weigh and consider, which of them are proper unto them, and inseparable from them; and what they have common with other Diseases. In the serious examination of al which *Franciscus Valeriola* hath taken extraordinary pains, in the sixth Book of his Enarrations, Enarrat. 5. the Reader may do wel to consult the place alleadged. We must not here also pass by in silence that which *Marcellus Donatus* hath in his first Book of the History of things wonderful in Physick, Chap. 4. by which we have occasion given us to think and conjecture, how great the corruption of the blood may possibly be in those that are Leprous. *Annibal Pedemontanus* (saith he) *having been for two yeers vexed and afflicted with an incurable Lepra, he was at the end thereof taken and surprized with a Pleurisie; and having a Vein opened, this strange thing befel him; the hot Urine that came from him (being in quantity more than the pot could wel hold, and upon which there swam a blood at least six ounces in weight) so soon as it was cooled was by the said blood thickned in such a manner, just as if the water had been Milk, and the blood the Curd thereof; so that in its consistency it seemed to be very like unto curdled Milk; yet still retaining its own proper color; of the which there was not one drop indeed to be found that was severed from the rest, and not curdled.* The cause hereof is given by the Author before cited, who conceived it to be, and imputeth it unto the thickness and clamminess of the blood, which being throughly mingled with the Water, (the actual heat of both of them assisting and furthering the distribution in their mingling together) when it had abated of its great heat, and was now become cool, gave the occasion of the said coagulation or curdling. And he conceiveth likewise that here the very same thing happened that cometh to pass, when the smal parts and pieces that are cut from Hides and Skins are boyled in Water for the making of Glew. For so soon as ever that Water is cooled, it instantly is thrust and forced close together, by reason of the clamminess and sliminess of the juyce; and the like also happeneth in some kind of meats that we eat, that are made of Calves feet, and the feet of other living Creatures.

Prognosticks.

1. By al which it appeareth, That this Malady is most grievous and dangerous, hard to be cured, and (the truth is) not at al curable unless it be taken in hand in the very beginning and first rise thereof; neither then without much ado and difficulty. For an *Elephantiasis* inveterate and confirmed wil at no hand admit of any Cure. For if a *Cancer* (being but a particular disease only) wil allow of no cure; how much less wil the *Elephantiasis* that is an universal *Cancer* of the whol body, admit and receive any? And indeed there is hardly to be found any Remedy that can subdue and conquer the greatness of this Malady.

2. This Disease is exceeding great and grievous, to wit, from the great store of corrupt humors; and there is in the body an extream and intense heat, to wit, so great that if any one thus affected (but for a short space) hold in his hand a new and green Apple, it wil become wrinkled and withered, even as if it had been for some long time dried by the heat of the Sun and the Air. And this same very malignity hath now of a long time taken deep root. For this Malady discovereth it self but very slowly; neither doth it at al appear before that the malignity of the humors have besieged (as I may so say) and shal have corrupted the bowels. On the contrary, the strength of Nature is but very weak; as it may sufficiently appear from the actions of al the faculties that are generally hurt and weakened.

3. Wherefore like as we do but in vain, and to no purpose at al, take in hand those that are altogether overmastered by this malady, and the long continuance thereof; so on the other hand, it argueth an overgreat despondency and despair in those Physitians, that deny their help and assistance for the cure and recovery of those that but only seem to be affected with this disease, but in very truth are not so. For as *Aetius* writeth, Tetrab. 4. Serm. 1. Chap. 120. *It is a sign of humanity, and an argument of brotherly kindness, in the most extream and worst of Maladies, to condescend likewise unto those Experiments that in al likelihood and probability may tend to the quelling and keeping under the rage and violence of the Affect.*

The Cure.

As for what concerneth the Cure of this Diſeaſe; in the curing of an *Elephantiaſis* that is but new begun, it is above all other things neceſſary and requiſite that the vitious humors be wholly removed out of the body; which to attempt wil yet notwithſtanding be but in vain, unleſs there be withal ſuch a like Diet firſt ordained and appointed, as by the which there may be no more of the vitious and bad humors gathered and heaped up together; but that thereby rather the fault and whatever is amiſs in the humors and the body may be rectified and amended. And this is done by ſuch things as cool and moiſten, to wit, as they are contrary unto the preternatural diſtemper, being hot and dry. Broths and ſuppings are in this caſe therefore very fit and proper; which may be qualified with Sorrel, Bugloſs, and Borrage; unto which likewiſe (as unto al other food the Patient eats) Harts-horn may be added and mingled therewith; as having in it an eſpecial and peculiar virtue of oppugning and ſubduing that aforeſaid malignity. Let his Meats be ſuch as afford a good and commendable juyce, and withal eaſie of digeſtion; his fleſh rather boyled than roaſted; or if at any time it be roſted, then among other Condiments, Sauces, or Sallades, let there be appointed him theſe that follow, viz. Sorrel, Lettice, the juyce of Citrons, Vinegar of Roſes, and Capars. But chiefly we commend the cream of Barley, with the Milk of ſweet Almonds. And on the contrary, let the Patient carefully avoid al ſalt meats, and ſuch as being ſalted are then ſmoke-dried, and ſo hardened; al fried and aduſt food, al ſpiced meats; as alſo Peaſe, Beans, Onions, Garlick, Muſtard, Hares fleſh, Harts fleſh, Beef, Swines fleſh, Fiſh (that have a viſcous and clammy juyce) and generally al other meats that breed a thick, melancholick, and aduſt humor. And when the ſick perſon is at his meals thirſty, mere and undiluted Wine is very hurtful for him, in regard that the heat and drineſs of the Patients body is thereby augmented: and as for Beer, thick humors are for the moſt part thereby generated; and therefore it wil be requiſite to find out for him another kind of Drink that he may dayly make uſe of without any the leaſt inconvenience. Of which ſort, the chief and principal is that drink that is made of the juyce of ſweet ripe Apples, and then throughly cleanſed from its Lees and Dregs. For this Drink is of ſingular uſe and benefit, not only for thoſe that are Elephantiack, but likewiſe for al Melancholy and Hypochondriacal perſons, as alſo for al others, whoſe Liver and Meſentery or Midrif afford matter and cauſe of a diſeaſe. For it tempereth and qualifieth the melancholy humor, diſcuſſeth the vapors thereof, recreateth the Heart, begetteth cheerfulneſs, tempereth and moiſteneth the dryneſs of the Bowels, and yieldeth a good aliment.

Another Drink there is that is uſeful and fit for al hot Natures, and hot Diſeaſes (provided that the ſtomach wil but bear it) and it is made after this manner:

Take *of the pureſt Water three quarts; Sugar ſix ounces; the juyce of Lemmons, or of the Citron, three ounces; (according to what the ſtomach of the ſick perſon, the ſtrength of the heat, and the taſt require) of Citrine Sanders two drams; let them boyl a little; and afterward add, of Cinnamom one dram; and ſtrain them.*

Thoſe that are of mean eſtate and condition may make uſe of the Piſan, or Barley boyled with Fenel ſeeds. But this following wil ſerve them for a more efficacious Drink.

Take *Sorrel, Marigolds, Meadow-ſweet, of each one handful; Pimpernel two drams; Shavings of Ivory, and Harts-horn, of each one dram; Raiſons ſtoned and wel waſhed two ounces; Liquoris raſped and cut into thin ſlices one ounce; Barley one pound. Boyl them in a gallon of Water until one quart thereof be waſted away. And what is ſtrained forth let it be ſweetened with the Syrup or Julep of Violets.* Or,

Take *the Root of Succory one ounce; Raiſons three ounces; Liquoris cut thin half an ounce; Harts-horn, Fenel ſeed, of each one dram; boyl them in a gallon of Water, almoſt unto a third part. And what is ſtrained forth, ſweeten it with the Syrup of Violets.*

Furthermore, as there ſhal be occaſion, let a vein be opened, and the body be purged, according to what the variety of circumſtances ſhal require; as for example:

Take *Caſſia one ounce; Elect. Diacatholic. two drams; Fenel ſeed half a ſcruple; and with Sugar make a Bole.* Or,

Take *Elect. Diacatholic. half an ounce; Confect. Hamech one dram or two; Conſerve of Borrage half a dram; Sugar a ſufficient quantity, and make a Bole.* Or,

Take *the Roots of Succory, and Scorzonera or Vipers Graſs of each three drams; Sorrel, Borrage, Bugloſs, Fumitory, Harts-tongue, of each one pugil or ſmal handful; of al the Cordial flowers two pugils; of the four greater cold ſeeds, and Fenel ſeed, of each half a dram; the Leaves of choice Sene half an ounce; Polypody of the Oak, and Mother of Thyme, of each two drams; Raiſons cleanſed half an ounce; boyl them in a ſufficient quantity of cleer running Water; and in four ounces and half of the ſtraining infuſe one dram and half of Rheubarb, and half a dram of Cinnamom; unto the ſtraining when it is preſſed forth, add of the Syrup of Fumitory, and Borrage, of each half an ounce; and mingle them well together.* Or,

Take *the root of Succory, Monks Rheubarb, Elecampane, of each half an ounce; Sorrel, Fumitory, Scabious, Bugloſs, Maiden-hair, of each*

one

one handful; Flowers of Borrage and Bugloss, of each half a handful; Liquorish thin sliced, and Raisins cleansed, of each six drams; boyl them in a sufficient quantity of spring Water; then take of the straining one quart, and infuse therein the Leaves of Sene, Polypody of the Oak, of each one ounce; the rind of black Hellebor half an ounce, Fenel seed and Anise seed, of each two drams; Citron one dram, Mother of Thyme (commonly known by the name of Epithymum*) five drams, Cinnamom one dram; afterward let them boyl gently, then strain them, and sweeten all with Sugar*, and of this let the Patient take (every or every other day) two or three ounces with the Broth of a Chicken. Or else there are other preparations and Purgations to be appointed, *Of the Whey of Milk, Fumitory, Harts tongue, Maiden hair, Borrage, Bugloss, Violets, Succory, Endive, Sorrel, Scabious, Thyme, Scordium or Water Germander, Liquorice, sharp Dock, called by some sowr Sorrel, &c. Of Epithymum otherwise called wild Tyme, or Mother of Tyme, Polypody, the Leaves of Sene, black Hellebor, &c.*

Now the Purgers and Preparers are often to be repeated; for so great and contumacious a Malady as this cannot be taken away by a Digestive or two, neither without frequent Purgations.

But there are likewise in the mean time Cordiall Medicaments to be made use of, and such as extinguish and abolish malignity; As,

Take *Conserve of Bugloss, Borrage, Violets, Water Lillies, Roses, of each two drams; Leaves of Gold three or four (or more if there be occasion) Harts-horn prepared, the best Treacle four scruples, Syrup of Apples, or Borrage, as much as is sufficient; make an Electuary.* Or,

Take *Conserve of the Flowers of Borrage, Bugloss, and Roses, of each one dram and half; the Species Diarrhodon Abbatis, and the best Venice Treacle, of each two drams; and with the Syrup of Apples make an Electuary; of which let the Patient take every day in the morning the quantity of a Walnut, and twice or thrice besides every week.*

So soon as the Patient hath taken his Electuary, let him presently be put into a Cestern filled with sweet Water; and let him sit herein for the space of one hour. But let the Bath be so temperate that there be no sweat caused, either in the Bath, or after his going out of it. For if any Sweat be excited, it is a sign that the Bath is hotter then it ought to be. There are many Physitians that forthwith send away the Patients unto the Natural and Mineral Waters. But in regard that they dry exceedingly, there oftentimes ariseth thence more hurt then good; especially in the beginning of the Disease, while the heat and driness are at the highest. And there a Bath of sweet Water is far more commodious and safe, which tempereth the driness, discusseth the excrements, and looseneth the Skin. After Bathing, the body may be anointed over with this Medicament following, or such like;

Take *the Juyce of Nightshade, and of Scabious, of each one ounce; the Root of the sharp Dock six drams, Vinegar of Roses one ounce, Elecampane root and Pimpernel, of each half an ounce; Oyl of Roses four ounces; the Rinds of black Hellebor tied up in a piece of skin, three drams; boyl them them until the Juyces be boyled away, and after this cast away the black Hellebor; and then,*

Take *fresh Butter one ounce and half, Vipers fat, or if that cannot be had, the best Treacle one ounce, burnt Lead half an ounce, Litharge and Ceruss, of each two drams; Frankincense a dram and half, Storax Calamite and Nitre, of each two scruples; Mingle and stir them wel about together with the Juyce of Lemmons, in a Leaden Mortar with a Leaden Pestle, untill it hath gotten the form of a Liniment.*

After bathing let him likewise use this Remedy, which some hold for a great secret: They burn in a new Pot the Head of a Kite, which after it is pulled and made bare of its Feathers, they cut off, as also the Feet and the Bowels being taken out; and of the Powder hereof they administer what they think requisite in a fit and convenient Liquor; and they prescribe likewise the eating of the rest of the Flesh at thrice, that is to say, a third part each day, for three daies together.

Solenander writeth that he himself made use of this following Remedy, and that with very good success. He taketh two or three Vipers or (if they cannot readily be gotten) other Snakes, and dissecteth them alive, and then together with good store of Barley he puts them into Water, and boyleth them until the Barley become soft. With this Barley, as also with the very Flesh it self of these Snakes he feeds many Pullets or Chickens, and gives them no other food; with the which after they have been for some few daies nourished they lose their Feathers, and within a short time they again get new ones; and afterward with this Flesh and Broths made of them he nourisheth the sick Person by little and little. And indeed this Remedy out of Vipers we find to be much used by the Ancients. For the body being first purged, in the spring time especially, they took Vipers and cutting off the Head and Tail (casting away the Skin) they gave the Flesh of these Vipers to be eaten by their Patients thus affected. But *Julius Palmarius* assureth us that *Fernelius* (although he made it a good part of his Study) yet he could not once in all his life time effect what he so much wished and so diligently studied for, to wit, the recovery and restoring of any by the use of Vipers. And by his advice likewise *Palmarius* himself administred these Vipers, and not only the flesh of them prepared

prepared divers waies (thus and thus) but the very Treacle it self also that is made of them; and yet notwithstanding without any the least success. For although at the first in the beginning of this Disease, this kind of Remedy may seem to benefit much; yet notwithstanding at the length by it the Elephantiack poyson and virulency is thrust forth into the Skin, and all the symptoms so exasperated (as he writeth) that in the end the putridness being augmented, they are as it were torn in sunder Limb after Limb. But however in regard that the Ancients have so much commended the use of Vipers, and some likewise of our latter Physitians have extolled the use of them, we therefore in this particular advise you to consult experience.

The Ancients likewise for a Remedy used Castration or Gelding; and they tell us in their writings, that many have been recovered by this means: Which (as *Valescus de Taranta* conjecture th) therefore cometh to pass, because that the Leprosie proceeding from an overdrineſs, the body by the taking away the Stones becometh much moystened, being hereby much effeminated; and so by this means the humidity thereof is in great measure retained.

And that we may conclude this Discourse, the *Elephantiasis* alone (as *Palmarius* writeth) more than any other of those Diseases that are of long continuance seemeth to rejoyce it self as it were in the variety and interchange of Remedies. And there are in this affect (if in any other) certain cessations and intermissions (almost from all Remedies) oftentimes to be allowed unto the sick Person; and then the same Remedies are anew to be repaired, and new ones to be added; since that scarcely ever did any recover of this Disease, that placed the hope of his safety in one only Remedy, though it were never so generous and prevalent.

Julius Palmarius puts much confidence in Hydrarge, which as he writeth doth every whit as much in this case as the flesh of Vipers, or the Viperine Treacle, or the Iron Instrument, or the Fire. But in regard that it will take up too much of our time, and cost much pains here to acquaint you with all that we might touching this subject; And in regard also that the same *Palmarius* in his Book of the *Elephantiasis* hath taken notice of many other such like Observations as touching this Disease; and that *Aetius* likewise, Tetrab. 4. Serm. 1. Chap. 121. &c. hath collected very many things concerning it; and that much also may be found in *Forestus* his *Rosa Anglica*, and in other Authors that have written upon this Subject; and lastly, in regard that *Schenkius* likewise in the sixth Book of his Observations hath collected many strange and rare things touching this *Elephantiasis*; in all these respects, I think it not amiss to refer the Reader unto those aforesaid Authors, for his more full satisfaction. And *Petrus Palmarius* likewise in his *Lapis Philosoph. Dogmatic.* Chap. 24. reciteth an History of a certain Leprous Woman, whom he Cured with *Aurum Potabile*, exuberated, and exalted upon a Sphere, as Chymists speak, and with the Antimony of *Alexander Suchtenius*.

Chap. 41. *Of a flatulent or windy Tumor.*

AND thus have we now at length dispatched and finished the Explication of al those Tumors that have their original from the Humors; it now remaineth that in the next place we treat of those Tumors that arise from winds. For there are peculiar Tumors that have their original from flatulency, or a flatulent and windy spirit; which the Grecks call *Pneumatoseis*, and *Empneumatoseis*, and *Emphysemata*; but the Latines call them *Inflationes*. Now this flatulent Tumor (as *Galen* tels us, in his Book touching the course of Diet in acute Diseases, Comment. 4. Text. 21.) is generated after a twofold manner; to wit, *By a flatulent Spirit collected in certain Cavities these Cavities being either exposed to the sense, or else such as are Contemplable by Reason.* Now by Cavities contemplable by reason (as he explains himself in his second Book to *Glauco*, & Chap. 5.) he understandeth those very Pores of the similary parts, and those little spaces that are interposed betwixt the said similary parts.

The Causes.

The Proxime, *i. e.* the neerest and conjunct Cause of this Tumor is a Wind, or flatulent Spirit. Now this is generated (as *Galen* writeth in his third Book of the Causes of Symptoms, and Chap. 4.) from a heat weak and languishing. For as absolute Cold cannot possibly excite any Vapor, so on the other side, vehement heat discusseth the Vapor. That which supplieth matter unto these flatulencies, is a humor, thick, flegmatick, or melancholick. The same do both flatulent Meats and Drinks afford, as also a cold, moist, and cloudy Air, an idle and sedentary life, and the suppression of accustomed Evacuations. The thickness of the part likewise that will not permit the Vapors to breath forth maketh much for the accumulation and heaping up of Winds.

The Differences.

Now there are of these flatulent Tumors many Differences; and this especially in regard of the parts affected; whiles that sometimes these Winds are collected under Skin, and about the Membranes of the Muscles; sometimes in the Membranes of the Bowels; sometimes in the very Cavities of the Bowels, *viz.* the Stomack, Womb, Abdomen, and *Scrotum*, or Gods.

Signs

Signs Diagnostick.

The flatulent Tumor is known by this; That the part is sometimes lifted up into a greater, and sometimes into a less heighth; and oftentimes likewise there is from the distension a pain excited; but yet notwithstanding there is no kind of heavinels felt and perceived in the parts; and unless the wind be shut up in some cavity, it doth very seldom continue long in one place, but wandereth up and down. If the Tumor may be pressed with the finger it leaveth no pit; but the Tumor either resisteth the touch of the finger, or else the wind passeth unto some other part; and if it be smote with the hand, it then sendeth forth a noise like that of a Drum; and by how much the cavity in the which the wind is contained is the greater, so much the greater is the noise or sound.

The *Emphysema* differeth from *Oedema*; because that the cause of *Oedema* doth alwaies stick in the pores, and the spaces of the parts that are contemplable by Reason; now what those parts are, you may understand by what we have said in the beginning of this Chapter. But the cause of *Emphysema* is often collected in some one certain Cavity. And albeit that same flatulent spirit be likewise sometimes dispersed through the streightest passages of the parts; yet notwithstanding (as we have told you) these *Oedema's* being prest do leave a hole or pit behind them; but as for the *Emphysemata*, they are not hollowed into a pit; and the *Oedemata* likewise if they be touched by the hand make no noise at al, as do the *Emphysemata*.

Prognosticks.

1. Flatulent Tumors if they be smal, and be not cherished by some pertinacious cause, they are then without danger.

2. If the flatulent Tumor be great, it then argueth a great debility of the heat, and an abundance of matter; and therefore it is more dangerous, because more contumacious and stubborn.

3. If the flatulent matter be detained in the Muscles, it is then hardly cured; in regard that the spirit is dispersed from the ambient Membranes into almost al the parts of the Muscle, as *Aetius* writeth, Tetrab. 4. Serm. 3. Chap. 2.

The Cure.

The wind that distendeth the part is to be taken away, and means used that it may not breed again, and flow unto the part; and the pain (if any there be) is to be mitigated and moderated. And therefore such a kind of Diet is to be ordained that maketh not for the generation of winds; and the matter out of which the wind is bred is to be evacuated; and the heat of the part that generateth the windiness is to be corroborated, and corrected, touching which we have already spoken in the places that shal be presently alleadged.

Such things as are hot and dry discuss windiness; and of this sort are the seeds of Caraway, of Cummin, Annis, Fennel, Carrot, Millet or Hirse, Juniper Berries, and Bay-berries, Camomil, Dill, Rue, Calaminth, Marjoram; as for example;

Take *Seeds of Caraway, Fennel, and Cummin, of each one ounce; Rue, Calamint, and Camomile flowers, of each one handful and half; Millet seed three ounces; then make a little bag or two, which throughly moisten in warm Wine, and apply them by turns one after the other.* Or,

Take *of Rue, and Betony, of each one handful; Parietary half a handful; boyl them in Ley until they be soft, and bruise them; then add pouder of Camomile flowers, and Bean Meal, of each two ounces; boyl them and make a Cataplasm.* Or,

Take *Oyl of Rue, and Camomile, of each one ounce; the destilled waters of Caraway, Fennel, Cinnamom, of each half a scruple; a little Wax; and make an Unguent.*

Chap. 42. *Of Tumors proceeding from the solid parts falling down into, or resting upon some other parts, in general.*

THere remaineth now to be spoken of the last kind of Tumors, which the solid and living parts excite. For these if out of their own proper place they fal down into another place, or else rest and lie thereon, they then elevate the parts incumbent, and more especially the skin; and so by this means they excite a Tumor or Swelling. But now, the Bones are those that principally do this. For these if in either their disjoyntings they fal out of their proper places or seats, or if being broken they change their scituation, they then lift up the part incumbent into a Tumor. But there is no need that we speak any thing in special, and particularly, touching these kind of Tumors. For like as they proceed from, and depend upon disjoyntings, dislocations, and fractures, so they are by them well known; and these being cured, they vanish.

And hither likewise belongeth Gibbosity, touching which we have already spoken in our second Book of the Practice of Physick, Part 2. Chap. 21.

There is likewise mention made by *Galen* (in his Book of Tumors, Chap. 14, & 15. and 14. of the Method of Physick, Chap. 17.) of a peculiar sort of Tumors arising from the Bones, and this he calleth *Exostosis*, you may cal it *Exossatio*, to wit; Eminencies and standings out of the Bones, and especially those of the Temples, and in other parts also: but as touching these, (in regard

referred unto *Nodi* and *Cornua*, Tumors above propounded, Chap. 38.) there is no need at al that we speak any thing further here in this place.

Furthermore, there are Tumors oftentimes excited by the soft parts moved out of their places, and falling down. And hither belongeth that kind of Tumors that the falling forth of the *Uvea* causeth, of which we have already treated in our first Book, Part 3. Sect. 1. Chap. 25. *Hernia* or Rupture of the Intestines, of which likewise above, in the third Book, Part 2. Sect. 1. Chap. 6. and the Umbilical or Navel *Hernia*, touching which also we have spoken sufficiently in the same place, Part 10 Chap. 2. And lastly, the Uterine procidency, and *Hernia*; and of this we have spoken likewise before, in the fourth Book, Part 2. Sect. 2. Chap. 16, and 17.

There remain yet only two sorts of Tumors, having their original from the living parts; the one from the Arteries, the other from the Veins: of which the former is termed by the appellation of *Aneurysma*, and the latter by the name of *Varices*; which Tumors we shal speak unto and explain in the two following Chapters, and with them we wil conclude and shut up this Tract of Tumors.

Chap. 43. *Of* Aneurysma.

Aneurysma, which is so called, not from the Greek word *Neuron*, but from *Anaeureumein*, which is as much as to dilate above; which word the Latines likewise retain, being not provided of a better and more proper; (for as for those that the Arabian Interpreters make use of, such as these, *Hyporisma*, *Emborisma*, *Emborismus*, *Aporisma*, they al of them have their original from the Greek word corrupted) that this *Aneurysma* (I say) is a Tumor arising from an Artery preternaturally affected, is a thing out of al doubt and controversie. For although the Author of the Medicin. Definitions saith that *Aneurysma* is a relaxation of a veiny little Vessel; yet notwithstanding, without al doubt the word *Venosum* is there taken for *Arteriosum* (that is to say, Veiny for Arterial) since that it is a thing generally wel known, that the Ancients did oftentimes cal the Arteries by the name of Veins.

But now what this *Aneurysma* is, and from what cause it ariseth, is a thing not altogether so manifest and evident. *Galen* indeed in his Book of Tumors, Chap. 11. writeth thus touching this Aneurysma: *But now* (saith he) *a mouth being made in an Artery, the Affect is called* Aneurysma. *Now this happeneth when the Artery being wounded, the skin that lieth neer unto it cometh unto a Cicatrice; but yet the Ulcer of the Artery still remaineth, the said skin being neither conglutinated, neither together brought unto a Cicatrice; neither filled up with flesh.* And the same *Galen* in his fifth Book of the Method of Physick, Chap. 7. hath left this written: *Unless* (saith he) *flesh produced do first fill up the place that is neer about the Artery cut asunder, but that there still remaineth some void and vacant place, then verily there followeth that Tumor we call Aneurysma.* Other Greek Physitians there are that are of the same Judgment and Opinion with *Galen*. For thus *Aetius* writeth touching this *Aneurysma*, Tetrab. 4. Serm. 3. Chap. 10. *Aneurysma* happeneth in every part of the Body, but more frequently in the Throat; where it produceth that Tumor we cal *Bronchocele*. It befalleth oftentimes unto Women in Child-bed, by reason of the violent detention and holding of their breath: but it happeneth likewise in the Head, nigh unto the places of the Arteries; and in the rest of the body also, where ever the Arteries are wounded: like as when ignorant and unexpert Physitians intending and attempting to open a Vein in the Arm, do withal prick, and oftentimes cut asunder the Artery lying underneath it. The very same is told us by *Paulus Ægineta*, in his fourth Book, and Chap. 53.

The same Opinion is borrowed from the Greeks by *Avicen* the Arabian, as appeareth by what he writeth in *Quart. quarti*, Tract. 2. Chap. 16. *And when the place of the Artery* (saith he) *is not from above coarctated and conjoyned close together, after the solution of its continuity, and that it findeth a voidness or vacuity, then the thing comes even to an* Emborismus, *which is named the Mother of Blood.* And a little after, thus he writeth: *And very many times* (saith he) *the Artery is not indeed covered over with flesh, but that which containeth the Artery is incarnated and covered with flesh, and is coarctated and closely conjoyn'd upon it. Wherefore the blood cannot have nor make any superfluous course; yea, somthing goeth out of it even unto the ends of the skin, which it receiveth and taketh in the quantity; and whensoever it is easily and gently pressed together, it returneth, and it's altogether bidden, like as we see it to happen in Ruptures.*

And this Opinion very many, and indeed most of the latter Physitians do follow. Yea, and *Platerus* himself likewise, who is otherwise wont to take liberty enough in examining the Opinions of the Ancients, writeth, That *Aneurysma* doth not only arise from the dilatation of the Artery (it yet remaining shut and entire) but also that more frequently (if not alwaies, if it be in the exterior parts) it proceedeth from a certain manifest and apparent opening thereof. For then the thin and sprightful blood breaking forth of the Artery under the skin lifteth it up into a Tumor or Swelling, and there formeth and frameth unto it self a hollow nook, and there in the Artery causeth this pulsation in this Tumor; even almost in the same manner as the Arteries are wont to empty themselves naturally into the hol-

low nooks of the thick Membrane of the Brain; so here they do it preternaturally, by pouring forth the blood (with and in breathing) in its *Diastole*, and in its *Systole* receiving it in again.

But this is an Opinion that I could never approve of; and therefore in the yeer 1606. (when I interpreted *Galen*'s little Book of Tumors) I altogether rejected it; and I then likewise propounded another, which out of those Lectures of mine, that noted and famous man Dr. *Bernhard* of *Sweden* made use of and Inserted likewise in his Treatise of the Inspection of Wounds. For if *Aneurysma* should proceed from the Effusion of the Arterial blood under the Skin; then certainly the said blood would diffuse and disperse it self, in length, and breadth, and round about; and would dye and colour the Skin of another Hieu; like as we see it to happen in Contusions, and in the opening of a Vein, when it is not exactly and rightly performed; to wit, when either the Vein is wholly cut through, or else when the Wound thereof by reason of the impetuousness and violence of the Blood is not rightly closed. For then the blood is very often poured forth under the Skin, even unto the extream and utmost part of the Hand; and the Skin is dyed with a Red, Green, and Yellow colour. Which must necessarily happen somuch the more, if an Artery be opened; in regard that the Arterial blood is thinner, and floweth forth with a greater force & violence: which yet notwithstanding never happeneth in *Aneurysma*, in the which that Tumor is conteined within its own Limits, and as it were in a Bladder; neither is the Skin dyed with any other color. And moreover if *Aneurysma* proceeded from a Blood poured forth under the Skin, in progress of time it would so happen that this Blood consisting and abiding in a strange and unfit place would putrefie like as we see it usually doth in *Ecchymoma*, as we told you before in the seventeenth Chapter.

Antonius Saporta indeed in his first Book of Preternatural Tumors, and Chap. 43. doth his endeavor to salve and answer these objections, whiles he thus writeth; *The Blood* (saith he) *if it altogether leaveth its own proper Vessels, and cast it self forth into a greater* Venter *or Cavity, being left destitute of the influx of the heat that should flow in unto it, wil necessarily putrefie: but in* Aneurysma *(which proceedeth from the opening of an Artery) it is not so far forth left destitute by the heat thereof, and by the rest of the Blood that is contained therein, that its native heat and colour should perish; neither is it expelled forth into any great space or* Venter, *that it should corrupt and putrefie. For it is cherished by the vital spirits contained in the Artery, since that its matter remaineth yet entire and continued. For albeit the Artery be divided, and the Blood causing the Tumor doth pass forth; yet notwithstanding the Flesh and the Skin that cover the Artery, continuing stil whol and entire it doth not alwaies so insinuate it self into any large and ample space, that it should be made thereby to putrefie, and rendered destitute of the help and assistance of Nature.* But the truth is, he doth not here by all that he alleadgeth acquit and free the Ancients from the aforesaid Objections. For if the Blood that is flown forth may be cherished by the vital Spirits and the heat of the Artery; why then is not the same done likewise when a Vein is smitten and pierced through, and when the Blood (the Vein being not as yet consolidated and exactly closed) issueth and floweth forth? Neither doth the Blood only then putrefie when it is poured forth into a large and sensible Cavity, but likewise whensoever it is shed forth under the Skin. Furthermore (as we have said) that Blood which we call Arterial is not poured forth round about, as the Vein Blood is; which yet notwithstanding it ought much rather to do, in regard that it is thinner, and more spiritful. For it is not sufficient (what *Platerus* writeth) that the Blood poured forth under the Skin doth there form and frame for it self a *Sinus* or hollow nook, not unlike the hollow spaces into which the Arteries in the thick Membrane of the Brain do insinuate themselves; and that the Skin is instead of an Artery unto that Blood that is poured forth out of the Artery; and that the Blood may from thence uninterruptedly repass, and flow back again into the Artery, without any Corruption. For the *Sinus*'s are framed by Nature, and so exactly shut up with Membranes, that nothing at all can possibly flow forth of them. But now the Arterial blood can no manner of way frame for it self any such *Sinus*, but whensoever it falleth forth without the Artery it diffuseth it self every where round about; and in regard that under the Skin all things are confluid, therefore the Blood easily maketh an irruption into the adjacent parts by that way and passage that is opened; the which we may likewise see the Veiny Blood to do (which is much thicker) and then the said Blood being out of its own, and in a strange place, soon putrefieth. Which appeareth even from that very History that *Antonius Saporta* writeth, as conceiving it to make much for the confirmation of what he had written touching *Aneurysma*, in his first Book of preternatural Tumors, and Chap. 43. Neither in truth was that Disease which he there describeth an *Aneurysma*, but only an effusion of the Arterial Blood, upon the rupture of the Artery, into the places lying neer about it, and there corrupting. But this is the Story that he telleth us. *Whenas* Johannes Fabri *that most acute and sedulous Scribe of the Palace at* Montpelier *had spent the chiefest part of his youth in riotous and inordinate Revellings and Feastings, and in a frequent and unseasonable Drinking of the strongest*

strongest sort of Wines, without any diluting, or qualifying the heat thereof, he began about the fiftieth yeer of his age to draw his breath with much difficulty, and to be affected with an extream troublesome palpitation and beating of his Heart. For the removal of this great Distemper there were many Remedies prescribed and administred, not only by my self, but likewise by the most expert Physitians of our University there. All which when they could not in the least prevail over this contumacious and head-strong Disease, by reason of the Patients continuing and persevering in his accustomed ill course of Diet, he grew the worse thereby; and after some few months were passed, in the which by the advice of the Physitians he took no Physick at all (for they were willing to commit unto Nature a part of the Cure of this Chronical Affect) he began to complain of that part that lieth under his left Shoulder-blade. The place of his grief being look't upon, and throughly considered, there appeared unto me a notable Tumor, soft unto the touch, and attended with a beating; and when pressed down with the Fingers, it was then seemingly wholly hid and non-apparent; but these were no sooner taken off, but forthwith it returneth as before. In short, the Disease having gotten deep rooting, & being now become incurable, our Patient within a very short time after departed this life. But now that we might get the truth and certainty both of the nature and constitution of this Disease, as also of the Cause thereof, we dissected that part that was affected with the Tumor; out of which there issued forth great store of Blood, unsavory and stinking as it was; all which Blood being wholly evacuated and throughly cleansed, there appeared the prime and principle Artery under the Heart (having its original from the great Vein in its ascending up into the Head) exceedingly dilated, and extreamly torn. This Vein descending downward creepeth along through the Region of the Intercostal Muscles; the Blood that flowed forth of it being heaped up in the spaces of the Muscles, and in tract of time putrefying and corrupting, had so vitiated and marred the Vertebra and Rib of that place, that it seemed unto us altogether rotten and putrefied.

And therefore (say we) some other way and means of the generating of this Tumor is to be sought and found out.

The Author of the Book of the Medicin. Definitions defineth *Aneurysma* by the relaxation of an Artery. And so likewise *Fernelius* in the seventh Book of his Patholog, and Chap. 3. asserteth that *Aneurysma* is a dilatation of an Artery ful of spiritful blood: but all this while they do not express the manner how this is done. Neither is it ever a whit credible that *Aneurisma* is caused by the dilating of both the Tunicles of the Artery, but only by the widening of one of them. For the Arteries have indeed a double Membrane, one external, which is slender, thin, and soft, having of straight Fibres very many, but of oblique ones very few, and of transverse ones none at all: the other internal, which is close, thick, and hard, having transverse Fibres, but wanting straight and oblique ones. And therefore if the Internal Tunicle be either broken by extension (as easily it may be in regard of its hardness) or else if it be opened by Section, it doth not easily Cement and close together again, because it is hard; but now the external Tunicle in regard of its softness doth easily and soon grow together again; and because it is so soft, and wanteth both oblique and transverse Fibres, it is thereupon extended by the Blood and the vital Spirit, seeking their passage forth in an imperious and violent manner; and so this kind of Tumor cometh to be excited; in the which the force and the impetuous violence of the blood and the vital spirit may be discovered by the very touch. Neither is that which *Platerus* objecteth of any weight or moment; to wit, when he tels us, that upon the alone bare Section that he saw made in the skin that covered over the Tumor, the blood forthwith at first bid it self, but then instantly sprang forth amain; and this oftentimes, saith he, is in so great abundance, that it cannot by any one (use he what means he wil) be any more stanched; but that it issueth forth in greater abundance, insomuch that the whol stock of Blood being almost spent it hath oftentimes brought a sudden Death upon the sick Person. But indeed if we should determine that the *Aneurisma* proceedeth from the dilatation of these Tunicles of the Artery, this Objection would then carry some weight along with it. But in regard that (according to the truth of the matter) we have already asserted and determined that an *Aneurysma* ariseth from the dilatation of the exterior Tunicle alone of the Artery (the internal being opened either by Section, or by Rupture) we cannot therefore by any means grant, that the Arterial blood lieth hid under the whole Skin: but because the external Tunicle is extraordinarily extended, it cohereth and sticketh so close unto the Skin, that it is extended together with it, and is in a manner so become one therewith, that it is almost impossible to cut the Skin without cutting the external Tunicle of the Artery.

The nigheſt cauſe of Aneuriſma.

And so then the result of al that hath been said wil be this, to wit, That the proxime and nigheſt cause of *Aneurysma* is, the opening of the interior Tunicle of the Artery, and the dilatation of the external. Now it is very frequently opened by Section, when unexpert Chirurgeons instead of a Vein open an Artery; or when at least together with the Vein they cut through the Artery that lieth under it. Now if this at any time happen, the external Tunicle in regard of its softness and neer alliance with the

Tunicles of the Veins very easily and soon closeth together again; but the interior (by reason of its hardnes) remaineth open; from whence through the patent and open place the Blood and vital Spirit endeavoreth to break forth, and by this means distendeth the external Tunicle, and causeth this kind of Tumor. The same may likewise happen if the internal Tunicle of the Artery be broken either by the violent and impetuous motion of the Arterial blood, or by any violent external cause, and the overgreat distension of the Artery; the external Tunicle (that is more apt for extension) being al this while safe and sound.

But now, Whether or no that pulsation of the Arteries, of which *Platerus* maketh mention in his Tract touching the palpitation of the Heart, (and touching which out of *Fernelius*, and *Ludovicus Mercatus*, we have already treated in the fourth Book of our Practice, Part 2. Sect. 3. Chap. 9.) may or ought properly to be referred unto *Aneurysma*, I very much doubt. For whenas the Membrane of either Artery is then whol and entire, it seemeth rather to be an Affect in the Veins, of kin to the swoln and distorted Veins that we cal *Varices*, than this Tumor *Aneurysma*, of which we are now treating.

Signs Diagnostick.

The *Aneurysma* is easily known and discerned from *Ecchymosis*, because that in *Aneurysma* the color is like unto the rest of the skin, and the Tumor is soft and loose, and for the most part giveth way and yieldeth unto the compression of the fingers, the blood running back into the Artery, from whence it instantly again floweth forth. There is likewise a Pulse to be felt in an *Aneurysma*. Although that *Paræus* hath observed, that somtimes in the *Aneurysma* (if it be great) there is neither any pulse to be perceived, nor any return of the blood (upon the compression) unto the more internal parts; and this I also observed my self in a certain Woman: but then notwithstanding there is to be perceived a motion, and as it were the loud noise of boyling water; and that not only when it is pressed down with the fingers, but likewise at other times; and this hissing or singing noise is not only to be perceived upon the touch of the fingers, but also upon the putting of the Ear close thereto; which proceedeth from the motion of the vital spirit in its passage through streight and narrow places. All which signs proceed not from the effusion of the blood under the skin, but from the dilatation of the Artery.

Prognosticks.

1. Al *Aneurysma's* are very hard to cure.

2. Yet notwithstanding those of them that are less, and newly arisen, wil admit of a Cure. But such of them as are old, and greater (in regard that blood cannot be driven back by Astringents, neither may the Artery be consolidated; and so they are no waies to be cured but by Section) wil hardly admit of any cure at al. For the Tumor being opened, and the Artery (as it is necessary) being cut, the Arterial blood floweth forth (together with the vital spirit) abundantly, al as it were at once, and with great violence; so that the sick person is oftentimes precipitated into extream hazard and danger of death. And there are many remarkable instances that might be given of such sick persons as in the opening of the *Aneurysma* have died under the hands of unskilful Chirurgeons.

3. Neither hath the Tumor that is joyned with an *Aneurysma* any great danger in it; but that the life may together with it be lengthened out for a long time. I knew a certain neer Neighbor of mine, in whom an unskilful Chirurgeon when he should have opened a Vein, cut an Artery; and it is now already above thirty yeers that she hath had an *Aneurysma* as big as a Walnut in the inward bending of the Arm, and al this while hitherunto she hath enjoyed (and stil even at present doth) perfect health, as if she ailed nothing at al. And therefore we conclude that better it is somtimes for the Patient to bear and undergo this sleight inconvenience, than to submit himself unto a dangerous Cure.

The Cure.

And therefore forthwith (even in the very first rise of it) so soon as ever we perceive that there is an *Aneurysma* excited, (for it is not suddenly done, but that dilatation of the exterior Tunicle of the Artery is caused sensibly and by degrees) let Astringents and Repellers be imposed upon the place affected, that so the force of the blood may be abated and qualified, and the open hole of the Artery may be shut up. For which end and purpose there may likewise very fitly be administred a thin Leaden plate, which doth repel, thicken, and bind close together the loosened Artery. There may also be administred astringent Cataplasms, and the Emplaster against a Rupture. And because that the *Aneurysma* somtimes also ariseth from the cutting of an Artery, we must do our endeavor, that if an Artery be cut (whether it be purposely done, or whether it happeneth by any ill accident) that it may immediately shut and close up again, and that in a right manner: which in regard that it is not here so easily effected (because of the violent and impetuous motion of the Arterial blood) as it is in the Veins, therefore we prescribe the following Medicament as very fit and proper for the Consolidating of the Wound of the Artery.

Take of Frankincense two parts, of Aloes one part and an half; Mingle them; and having shaken them wel together with the white of an Egg, tye up all with the Flix of a Hare as much as wil suffice,

ſuffice, and let them be laid upon the Wound of the Artery.

And of this kind there are divers other Medicaments to be prepared, of the Roots of the greater Comfry, Maſtick, Frankincenſe, Pomegranate Rinds, Acacia, or binding Bean-tree, Hypociſtis or the hardened juyce of Cyſtus, Myrtle, Gals, Aloes, ſealed Earth of Lemnos, Bole-armenick, Lapis Hematites or the Blood-ſtone, and the Emplaſter Diachalcitis.

If in this manner and by theſe means the growth and encreaſe of the *Aneuryſma* cannot be hindered; there are indeed ſome that adviſe and perſwade us unto Section; and the Tumor being opened, the Artery that is to be cut muſt be intercepted by binding it about with two bands; and then it muſt be diſſected between the two bonds; and theſe bonds (as they teach us) are not to be looſened, until that Nature hath covered over the wound with fleſh, and that now al the fear of the bloods iſſuing forth, and al the danger of an Hemorrhage be paſt and gone. Now as for the manner of cutting the *Aneuryſma*, *Ægineta* acquaints us with it in his ſixth Book of Phyſick, Chap. 37. in theſe words: *If the Tumor* (ſaith he) *be cauſed by opening, then we uſe to inflict upon the skin a ſtraight Section made longwaies; and then after this the lips of the skin being parted and far ſundred by little hooks, we make bare the Artery, ſevering it from its Membranes by Inſtruments very fit for this purpoſe; and then after the tranſmiſſion of a Needle under it, we tie it with two threds; and then ſo ſoon as we have pricked with a Pen-knife the middle part of the Artery, and have evacuated what was therein contained, we then betake our ſelf unto the ſuppurative cure, until at length the ties of the threds fal off. But now if the dilatation be cauſed from the rupture of an Artery, then it behoveth us (as far forth as poſſibly we can) to lay hold upon the whol with our fingers, together with the skin: then to caſt through it (beneath that we have laid hold on with the fingers) a Needle, that may (if you pleaſe) have in it two threds, or rather one thred doubled: and after the caſting through of the Needle and thred, we are then to cut in two the very handle (as I may ſo cal it) of the double thred, and ſo to bind about the Tumor (on this ſide, and on that) with the two threds. But if there be any cauſe to fear leſt theſe threds ſhould ſlip and fail, then in this caſe there is likewiſe another Needle to be caſt through, that may throughout lie and preſs upon the former, and this Needle may likewiſe draw after it two threds, or a double thred; and the handle thereof being cut in ſunder we then bind about the Tumor with four threds, or elſe the Tumor being opened about the midſt of it, after the emptying forth of what is therein contained, we cut off the skin, that being left remaining that was tied about; and then a long ſpleen-like Plaiſter wel moiſtened in Wine and Oyl being laid thereon, we conclude and perfect the Cure by Liniments.* But who is he that ſeeth not, that this kind of Cure is not only cruel, and ſo cruel that few or none wil ſubmit unto it; but that it hath likewiſe much danger in it, and yet for al that doth not heal the ſick perſon? For although the Artery be bound about; yet notwithſtanding after the threds are looſened there is cauſe to fear, leſt that either an Hæmorrhage follow, or elſe that a new *Aneuryſma* be cauſed. And therefore the more ſecure and ſafe courſe is, only to bind hard, and preſs together the Tumor with Bands and Medicaments, that ſo it may not gain any further augmentation.

Chap. 44. *Of the ſwoln Veins, called* Varices.

Varix, with the Greeks *Kirſos* (this being the name given unto it by the Greek Phyſicians only, for we find *Ariſtotle* in the third Book of his Hiſtory of living Creatures, Chap. 11. and 19. and *Plutarch* in the Life of *Caius*, calling it *Ixia*; as *Galen* in his tenth Book of the Method of Phyſick, and laſt Chap. defineth it; and as out of him *Paulus Ægineta* hath tranſcribed it in his ſixth Book, Chap. 82. and *Aetius*, Tetrab. 4. Serm. 2. Chap. 48.) is the dilatation of a Vein; this ſaid dilatation of a Vein being called *Varix*, as that before mentioned dilatation of an Artery was termed by the Greek Phyſitians *Aneuryſma*; of which in the foregoing Chapter.

But now theſe *Varices* happen in divers parts of the body, but moſt frequently in the Thighs, and yet notwithſtanding ſomtimes likewiſe in the Temples; as *Paulus* telleth us in the place before alleadged; and ſomtimes in the loweſt part of the Belly, under the Navel; and oftentimes alſo about the Teſticles, and the Cods; which ſaid Tumor is (in ſpecial) called *Kirſocele*.

The Cauſes.

They are generated from great ſtore of Melancholly blood, which (as *Galen* writeth in his Book of black Choler, Chap. 4.) Nature oftentimes tranſmitteth unto thoſe Veins that are in the Thighs, by the which being diſtended and dilated they are rendred *Varicoſe* or ſwoln up; and the skin that toucheth upon theſe kind of Veins in proceſs of time becometh of a blackiſh color. But now as for ſuch in whom there is only great ſtore of blood flowing in that is not Melancholy; it reſting indeed, and wholly relying upon thoſe Veins which there in that place are naturally more weak than elſwhere, doth dilate them, but ſcarcely ever dye them of ſuch a like color, as it happeneth when Melancholy blood ſhal produce theſe *Varices*. For ſuch are in very great danger (if any one aſſay to cut forth the Veins affected) of being

ing surprised with Melancholly. For this is frequently seen to happen, not only in *Varices*, but even in the Hæmorrhoids also that consist of the same kind of humor, even as the coming of them upon those that are mad is wont to be a freeing and discharging of them from their madness; as *Hippocrat.* in the sixth of his Aphorisms, Aphor. 21. And yet notwithstanding, scarcely ever doth good blood (though it abound never so much) by its great plenty alone produce and cause *Varices*, as it doth if it be both plentiful, and withall if it be thick; which by its weight tendeth downward unto the Thighs. Whereupon it is also that the *Varices* have not their being until the ripeness of age; as *Hippocrates* in *Coac. prænot.* toward the end teacheth us; in regard that a thick and melancholly blood is not generated sooner in the Body. And likewise *Pliny* in his eleventh Book and Chap. 45. writeth that the *Varices* happen in the Thighs of Men only, and very rarely in Women. Such likewise as are bald, in these the *Varices* become not great: but for such as (while their baldness is upon them) are afflicted with these *Varices*, these come again to receive their Hair; *Hippocrat.* in the sixth of his Aphorisms, Aphor. 34. Which yet notwithstanding *Galen* affirmeth to be a falshood (in his Comment) unless haply any one will understand his of that affect that Physitians call *Madarosis*, that is, the shedding or falling off of the Hair. For this Affect since that it hath its original from vitious humors (as likewise the *Alopecia* hath, and also that we call *Ophiasis*) if those very depraved humors being translated into the Thighs do cause the *Varices*, the sick Persons may then possibly recover and receive their Hair again. For if at the first the loss of the Hair proceeded from vitious humors their corrupting and corroding the very roots of the Hair; then (questionless) these said humors taking now their course into some other place, the Hairs will again return unto their naturall State.

The more remote Causes are all those that make for the generating and breeding of thick and melancholly blood; and especially the Spleen when it is distempered maketh much unto, and helpeth forward the generation of these *Varices*. And that likewise which much furthereth the flowing of the aforesaid humors unto this part, may be comprised under on of these Heads, to wit, either a blow, or streining overmuch, long and tedious foot journeys, extream hard labor, and the like.

Signs Diagnostick.

These *Varices* are easily known, whenas swelling Veins in the very superficies of the Members (and especially of the Thighs) appear unto the very sight it self; and the part affected appeareth either Leaden coloured or black; and the Tumor being pressed down seemingly retreateth back, but forthwith returneth again.

Prognosticks.

1. These *Varices* of themselves carry little or no danger in them; neither bring they any unto the Party thus affected; but they rather preserve and free such as have them from other Diseases, especially Melancholly Diseases; touching which *Hippoc.* in the sixth of his Aphorisms Aphor. 21. thus writeth; *If Varices, or the Hæmorrhoids happen unto such as are mad, they are thereby freed of their madness; and the whole Body is by them throughly purged from all flatulent Blood.*

2. But if they be unseasonably taken away (as *Galen* in his Book of Venesection against *Erisistratus*, and Chap. 6. and in his Book of black Choler, and Chap. 4. teacheth us) Madness, the Pleurisie, the pain of the Reins, the Hæmorrhoid Flux, the Cough, and spitting of Blood, the Apoplexy, Cachexy, Dropsie, and other Diseases arise.

3. Sometimes these *Varices* do pass into the *Elephantia* of the *Arabians*, touching which we shal speak further in the next following Chapter.

The Cure.

Unless therefore the *Varices* be of the biggest size, and that the Veins and the Skin by reason of their extension be so extenuated that there be great cause to fear a Rupture, a profusion of blood, and Death it self; and again unless they be inflamed, and extreamly painful; or that there be present some great and malignant Ulcer; they are by no means to be healed, lest that these being removed, some more grievous Evils befall: Since that those things only may be said to heal that do altogether free the Party; and not those things that generate another Affect more dangerous then the former; as *Galen* teacheth us, in the sixth of his Aphorisms, Aphor. 26.

And therefore if it like you to Cure these *Varices*, this ought to be done with great Caution; there must be some of the blood let forth; the Body must then be purged, and that not only once, but twice or thrice; and whatsoever is amiss in the Liver and the Spleen (if they be ill affected, and administer cause unto the *Varices*) is first of al to be corrected. And afterward we are to make use of Astringent, Drying, and Digestive Medicaments; as also of Swath-bands, and Ligatures, that may thrust forth the blood from the inferior parts unto the superior.

These things if they profit not, but prove successless, the Ancients were then wont to betake themselves unto Section or Cutting. *Oppius* is our Author (as *Pliny* relateth it in his eleventh Book, and Chap. 45,) that *Caius Marius* (who had been seven times Consul) was the one man that standing suffered these *Varices* to be taken out of him; the one man (saith he) I cal him, because

cause that as he was the first, so he was the only man in those times. But after him there were others also that suffered the same to be done unto them standing, and even without any bonds. For so *Cicero* tels us in the second Book of his Tusculane Questions, towards the end thereof. *But in good truth* (saith he) Caius Marius, *a Country-man* (but yet *a man every inch of him*) *when he was cut of the* Varices, *at the very first forbid them to bind him: Neither before* Marius *was there ever any heard of that was cut without being bound. Why therefore were others afterwards? His Authority and Example caused it so to be. Seest thou not therefore that the Evil of this Affect was more in Opinion, then it was really, and in Nature. And yet notwithstanding that this Affect was not without its sharp biteing pain, the same* Marius *sheweth: for he yielded up only one Thigh* (*whereas they were both of them affected*) *to be cut, and not his other Thigh that ailed altogether as much; so that he as a resolved man was contented to suffer pain, but then as a Rational Man he refused to undergo a greater pain then there was necessary Cause for: the whole of what thou art taught by his Example consists in this,* viz. *that thou carry a Commanding power over thy self. And of the same thing* Plutarch *writeth in the life of* Caius Marius: He may be for an example unto us (*saith* Plutarch) *in that when he was diseased in both his Thighs, and having them both ful of these* Varices, *and bearing the deformity of them with a very ill will, he took unto him a Physitian for the curing of one Thigh only; in the cutting whereof he did not so much as blinch, or once stir his body, neither was he heard so much as once to sigh; but when in silence, and with fixed Eyes he had rendred himself to be cut, he was not at all affraid* (*during the time this cutting took up*) *to suffer and undergo certain intervals of pains caused by pauses and delaies. But yet he would not in the least consent unto the Physitian requiring him to render & yield up his other thigh to be cured; but thus he said, I know wel that the Remedy can no waies countervail these so great pains. And haply these are those things, of which* Seneca *in his eleventh Book, Epist. 79. saith;* He, that whilest he was suffering those *Varices* to be cut forth continued al the while reading of a Book. *But yet at this day there is hardly any one that wil admit of this Remedy, for the removal of that deformity that is caused by these* Varices. *As for the manner of cutting them out,* Paulus Ægineta, *in his Book 6. Chap. 82. teacheth us how it ought to be performed. The man being washed* (saith he) *and a string tied about on the upper part of his Thigh, we command him then to walk; and then when the Vein is filled ful, with writing ink or with a Colliry we mark it, according to its situation, the length of three fingers, or somewhat more; the man being then laid upon his back with his Thighs extended, we then bind about another String above the Knee, and by this means the Vein being elevated into a considerable heighth, we cut with a Penknife in that very place which we marked, no deeper then only through the Skin, that so we may by no means divide the Vein; and then the Lips of the Section being distended with little hooks, and the Membranes being excoriated and fleyed off by those crooked Penknives that are provided in Watery Ruptures, and the Vein being altogether made bare and naked, and laid open to the view on all sides, we then loosen the Thighbands; and the Vessel being elevated by a little hook, we cast under it a Needle drawing along in it a double Thread, and cut in two the nook of the Thread; and then* (*the Vein being divided in the midst by a Venesectory Penknife*) *we evacuate and let forth as much of the blood as is needful: then after this, with one of the threads we tie close together the upper part of the Vessel, and the Thigh being extended straight forth, by the expression or hard pressing of the Hands we empty forth that blood that is in the Thigh: and afterwards we again beneath tie the vessel close together; or we cut off and take quite away that part of the Vein that lieth between the bonds, or otherwise we permit it to remain, until that at length together with the bonds it fal out of its own accord: & then putting in dry Liniments, and a long spleen-like Emplaster after it hath been throughly moystened in Wine & Oyl being laid thereupon, we bind it down close, and so we cure it by the continued course of suppurating Medicaments, that are to be administred and applied in the nature, and after the manner of Liniments. Neither am I ignorant, that some of the Ancients used none of these bonds and Ligatures; for some of them presently cut forth the Vessel so soon as ever they had made it naked and bare; and certain others of them with violence draw forth and break off the said Vessel, so soon as they have extended it from the bottom. But the truth is, that before mentioned way of Manual operation is absolutely the best, and of all other the most secure. Moreover, as for the* Varices *that consist in the bottom of the Belly, we handle them in like manner; as likewise those that consist in the Temples.* Thus far *Ægineta.*

Cornel. Celsus in his seventh Book and Chap. 31. telleth us of a twofold manner and Method of curing these *Varices* by Chirurgery, when he thus writeth; Every Vein (saith he) that is hurtful either withereth and wasteth away upon its being burnt, or else it is cut forth with the hand. If it be straight, or if though it be transverse, yet notwithstanding if it be simple; or else thirdly, if it be not overgreat, it is the better burnt. If it be crooked, and be as it were implicated into certain Orbs, so that many of them are as it were involved, and folded one within the other, it is then more convenient to take them forth. The manner of burning is this. The Skin having first an incision

incision made upon it, then the discovered Vein is to be a little pressed with a thin and blunt piece of Iron heated red hot; and great care must be had lest that the sides of the orifice it self be burnt, wch to draw back again with smal hooks wil be no very hard matter. This is to be done by interposing welnigh four fingers in a rank throughout the whol *Varix*; and then there is to be imposed thereon such a Medicament whereby those things that are burnt may be healed. But then it is to be cut forth after this manner. The Skin (like as before) having an incision made in it upon the Vein, the orifice is to be kept open with a little hook, and with a penknife the Vein is to be drawn a little and loosened from the body; and here great care must be taken lest that in the doing of what went before the Vein it self receive any hurt: and under it a blunted hook is to be cast, and there being interposed almost the same distance as we shewed you above, in the same Vein there is the very same thing to be done as aboveseid; which said Vein whither it tendeth, is easily known by the extended hook. And so soon as the same hath been done whersoever the *Varices* are, the Vein being brought unto some one place by the hook is there to be cut off; and then after this, in that place where the little hook is next unto it, it is there to be drawn forth, and there again it is to be cut off. And so the Thigh being on al sides freed from the *Varices*, then the mouths and orifices of the incisions are to be united, and strictly closed together, and upon the same there is to be imposed a conglutinating Emplaster.

Avicen (Book 3. Fen. 17. Tr. 1. Chap. 18.) cutteth the Skin until the *Varix* appeareth, and this he doth indeed longwaies, and not either obliquely or transversly: and then he extracteth and draweth forth al the blood that is in it; and then he cleanseth it by cutting it in length. But somtimes (as he writeth) it is to be drawn forth with a Needle, and so to be cut. He addeth moreover, that a drawing of it out with a Cautery is better than the cutting of it forth.

But in regard that the Cure of *Varices* by excision or cutting forth is not only rough and very difficult, but also because that for the most part it is not attended with an happy success, by reason of the flux and effusion of blood that hindereth the operation; therefore *Hieronymus Fabricius ab Aquapendente*, in his Treatise of Chirurgical Operations, teacheth us how we may cure these *Varices* in another manner, that is far better, to wit, without the extraction and drawing them out; on this wise. *Since that there are* (saith he) *three things to be considered that concur unto the constituting of* Varices, *viz. The Blood that floweth, The Flux thereof, And the Dilatation of the Vein; therefore there are three things likewise that are shewn and pointed out hereby; to wit, That the flowing Blood is to be intercepted, That which is already flown in to be evacuated, And the widened Vein to be streightened and made narrower. For the intercepting of the course of the blood, in the beginning and the end of the* Varix, *we ought to cast a bond and tie upon it; which is done either by that we cal* Sella recurvata, *or by a Hook, or by laying hold upon the vein with the top of two fingers, and lifting it up thereby, and then transmitting a needle drawing a thread along with it through the lower part of the vein, and there tied together: upon which part the skin is to be cut, that so the vein may appear, and may be tied; and it is not to be cut when it hangeth forth unto the external parts. We might likewise administer the same means, and use the very same way to intercept the blood, that Farriers use in intercepting the blood in Horses, that is, to press the Vein close together with a little thin Iron Plate fastened unto the Vein with a pair of Tongs. But then for the Evacuation of the blood that hath already flown in,* Hippocrates *in his Book of Ulcers, about the end thereof, teacheth us how and in what manner this is to be done. In the place alleadged he giveth in charge, that the Varicose or swoln vein be not cut with any great and wide gash left that thereby a great Ulcer be caused, by reason of the influx of the* Varix; *but rather (as* Hippocrates *saith) the* Varix *it self is again and again to be pricked whensoever we have any opportunity, and shal find it to be fit; from which said prickings the blood that hath already flown in, and filleth the swoln Vein, is evacuated and emptied forth; and this is done by degrees, and by little and little; and not al at once, and on a huddle as it were, and with much danger unto the Patient. But however, it is evacuated, if not wholly, yet at least so much thereof (even to the greater part of it) that the vein may withal likewise sink and fal down in some one part or other. This being accomplished, we come then unto the third and last scope, that is, the astriction and streightening of the dilated and over widened vein. For my own part I am wont to make up a Medicament of Tragacanths macerated in the Wine of Pomegranates, or the juyce of unripe Grapes; and then after this, I add the Pouder of Bole-armenick, Mastick, and Dragons blood, in equal portions, until the Tragacanths being melted or softened become as thick as Wax, so that in the hollow of the Hand they may be reduced unto the shape and form of a Candle: which being done, I put the Medicament longwaies upon the* Varices, *and above upon it the rind of a Reed, that by its Cavity may answer unto the Convexity of the Medicament, and that may the better keep down the Medicament: it is to be laid on in the length of it, and to be tied about the Thigh with bonds, or else with a narrow Swathband: for so both by this compression of the Swathband, as also by the astriction of the Reed, and*

and the Medicament, the Varices *have been oftentimes so streightened and close bound, that they have seem'd even to consume and wither away. I have now and then likewise made use of the condensed Juyce of* Hypocistis *or the excrescence of the Plant* Cystus. *And lastly, I have sometimes made use of a more mild and yet more gentle kind of Chirurgery, and especially when the* Varix *hath been but smal and inconsiderable. For laying aside the Ligaments, and the compunctions or prickings of* Hippocrates, *I made use only of the Medicament before mentioned, according to the length of the* Varix, *and binding it down with a part of the Reed tied fast thereupon; or else a Spunge somwhat long and writhed, and of the thickness of the* Varix, *bound about with a thred, and moistened in the juyce of Pomegranates, or of Hypocistis, and then rightly tied and bound on with a narrow Swathband: and for this purpose very beneficial likewise are the unripe fruits of the Wood* Guajacum *wel bruised, and imposed; all which by their astriction do intercept the blood, and bind the veins together, and by their much drying they likewise evacuate. And lastly, for preservation of the part, I made use of a hose or buskin made of a dogs skin, which was to be put on, and exactly fastened on about the Thigh.* Thus *Fabricius.*

Gulielmus Fabricius, in his fourth Cent. Observ. 85. relateth a History; as also the Cure of a monstrous *Varix*. The story is this: There was (saith he) a certain extraordinary strong man who had in his left Leg a malignant and inveterate great Ulcer, together with a *Varix* of a vast magnitude. For in thickness it was equal unto that part of the Arm that is next unto the Wrist; and it was welnigh a span long. Now it began in the very Ham, and descending toward the Foot it made a Ring, and two Circumvolutions. But that which was here worthy of observation, was this, That so soon as ever the man lift up his Leg any thing high, forthwith the blood drew back; and no sooner did he put it again upon the ground, but it again descended, and that in an instant and moment. And (in short) the blood did ebb and flow no otherwise than as if it had out of some narrow pipe been cast forth somtimes into this, and somtimes into that part. As for the Cure, he thus proceeded in it: Having appointed unto the Patient a fit course of Diet, and several times likewise purged his body, and having also opened a Vein in the Arm of the same side, he placed the sick person upon a Bench, and then in the very Ham he gently separated the Skin from the Vein it self. Then with a thread twice doubled, and put into the Eye of a crooked Needle, he woond about the *Varix*; and in the lower part of the *Varix* he proceeded in the very same manner. But before he tied the thread, and made fast the knot, he caused his Leg to be taken off the Bench and set upon the ground; and this he did, to the end that the blood (according to its custom) might flow downward. At length he first of al tied the thred hard in the upper part of the *Varix*, and then he fastened it with a knot; thus he did afterward likewise in the lower part. This being done, with a Penknife he maketh an incision in the almost uppermost part of the *Varix*, that so the blood that was contained in the *Varix*, as in a long and little bag, might the better flow unto it. But when the flux of blood proved to be greater than what was proportionable unto the greatness of the *Varix*, and that he attentively and exactly viewed the place, there was found a blind passage, which from out of the lower part of the Ligature entered into the *Varix*. This passage whenas it could not be tied with a thread, he first applied unto the entrance thereof some of the Escharotick Unguent; and after that he applied in great abundance his own Pouder together with the white of an Egg, for the stanching of the blood flowing from it; and al these things he bound fast on with a Swathband throughly moistened and wet in *Oxycrate*; and thus he left it even until the day following. At length he cured the Wounds that himself had made, after the manner of others. And so this man (by Gods gracious assistance) became perfectly whol and sound.

Chap. 45. *Of the* Elephantiasis *of the Arabians.*

WHat kind of Affect *Elephantiasis* and *Elephantia* of the Greeks is, as likewise *Lepra* of the Arabians, we have told you before in the 40. Chapter; to wit, that it is a malignant Tumor of the whol body, and as it were an universal Cancer. And of that Tumor *Avicen*, in his third Book, Fen. 3. Tract. 3. Chap. 1. And *Rhases*, in his sixth Book to *Almansor*, and Chap. 35. have discoursed at large.

Elephantia of the Arabians.

But as for the *Elephantia* (of which the Greeks speak not one word) the Arabian Physitians make frequent mention thereof, as being neerly allied unto the aforesaid *Varices*, and having its original from them, and being only a Tumor of the Feet. Of this *Elephantia Avicen* treateth in his third Book, Fen. 22. Tract. 1. Chap. 18. where he likewise handleth *Varices*; *Rhases* in his ninth Book to *Almansor*, Chap. 93. Yet notwithstanding *Haly Abbas* dissenteth from these, and followeth the Greek Physitians, in the eighth Book of his Theoric. Chap. 15. and in the fourth Book of his Practice, Chap. 3. Which last saith that *Elephas* is a disease corrupting al the Members of the Body, and as it were an universal Cancer. But neither do we find this Author alwaies in one and the same opinion; for in the eighth of his Theoric. Chap. 18. we have

him writing thus: *Those Ulcers* (saith he) *that arise in the Feet, and in the Thigh, are called* Elephas. *And the Elephantiack Disease is a melancholly Apostem, that appeareth in the Thighs, and in the Feet; and the sign thereof is this, that the shape and figure of the Foot is like unto, and much resembleth the figure of an Elephants foot.* All the rest of them treat of *Lepra* and *Elephantia* apart and severally; and they say that *Elephantia* is a Tumor of the Feet, arising from melancholy and flegmy blood, and from *Varices*; by reason of which blood the feet of the sick person are in their figure and thickness very like unto the Feet of an Elephant. And this kind of Tumor is oftentimes to be seen in the highway Beggars, that get their livelyhood by asking relief in those publick and common places.

Signs.

The Affect it self is manifest enough; whenas the Thighs of the sick persons are tumid and much swoln, very red, and somtimes wan and leaden colored, and oftentimes black, and for the most part ful and abounding with Ulcers.

Prognosticks.

But it is very rarely cured, not only because such as are herewith affected are for the most part of the meaner sort and condition, and therefore are not able to allow themselves Phyfick; but also because that from al parts of the body there are abundance of Humors thrust forth thither, viz. unto the Feet.

The Cure.

And therefore there is no Cure at al to be hoped for, unless those vitious humors be oftentimes evacuated and emptied forth of the body; and the vitious dispositions of the Bowels (from whence there is a continual supply of those naughty and corrupt humors) be corrected; and as *Avicen* in the place alleadged writeth, The whol sum and substance of the Cure consisteth in the continuing and perpetuating of the cure, until it be perfected. Which, how and by what means it may and ought to be accomplished, we have hitherto oftentimes declared unto you.

And now when this is done, the growth and encrease of the Tumor is to be prevented by astringent and drying Medicaments; and that which is already in being ought to be discussed by strong Resolvers.

But if the Malady hath been of long continuance, and be now confirmed, there is scarcely any the least hope of recovery left; of which see further in *Rhases* his ninth Book to *Almansor*, Chap. 93.

The Tumor of the Hands.

Antonius Saporta in his fourth Book of Preternatural Tumors, and Chap. 25. applieth al whatsoever the Mauritanians assert touching this *Elephantia*, unto a certain Tumor of the Hands; but this he doth much besides their minds. For when the Mauritanians speak of this *Elephantia*, they do not so much as make any the least mention of the Hands, but only of the Feet. And yet in the mean time it is not to be denied (which I have somtimes observed, and in the second Book of our Practice, Part 1. Chap. 25. given the Reader notice thereof; although I have not as yet met with any Author that maketh any mention in special of this Tumor) that oftentimes also the Hands (the rest of the body being sound and wel) do so swel up; & that being pressed down by the fingers, in the manner of the *Oedema*, they leave a pit or dent behind them. Which Malady without al doubt hath its original from humors cold and thick. And unless it be timely and in the very first rise of it met withal, and presently cured, it is very rare that it afterward admitteth of any Cure; in regard that the sick persons refuse for the most part universal evacuations of the body, without which this Malady is not to be removed, and wil not away with the tediousness of a long Cure.

Universal Evacuations of the body having gone before, and the Bowels in which the vitious humors are generated having been first strengthened; then afterwards the stronger sort of discussers are to be administred, viz. Such as are made of Camomile, Flowerdeluce Root, round Aristolochy or Birthwort, Walflowers, Ammoniack, Bdellium, Opopanax, and the like.

Chap. 46. *Of Particular Tumors.*

THere is likewise by Physitians frequent mention made of other Tumors; but they are such as either may be referred unto those Tumors that have been already hitherunto treated of by us; or else they have been spoken of and explained among the particular Affects of Mans body; so that it wil be altogether needless here to add any thing more in special unto what hath already been said of them in general. We treated of the Tumors of the Brain, in the first Book of our Practice, Part 1. Chap. 28. Of the *Fungi* of the Brain, *ibid.* chap. 26. Of *Hydrocephalus*, *ibid.* chap. 29. Of the Tumors of the Eyelids, *ibid.* Part 3. sect. 2. chap. 2, 3, 4, 5. Of the Ophthalmy, *ibid.* chap. 12. & 13. of *Unguis Oculi*, *i. e.* the Nail or web of the Eye, *ibid.* chap. 14. of the adnate Tunicle, *ibid.* chap. 17. of the Cancer of the Cornea Tunicle, *ibid.* chap. 19. of Suggillatio of the Eyes, *ibid.* chap. 22. of Encanthis, *ibid.* chap. 31. of the Inflammation of the Ears, *ibid.* part 3. sect. 3. chap. 2. of the Cancer of the Nostrils, *ibid.* sect. 4. chap. 2. of Polypus, *ibid.* chap. 3. of the Tumors of the Lips, in the second Book of our Practice, part 1. chap. 1, & 2. of the Tumors of the Gums, *ibid.* chap. 10. of the Inflammation of the

the Mouth, *ibid.* chap. 18. of the Inflammation of the Weſand, *ibid.* chap. 21. of the Inflammation of the Tonſils, *ibid.* chap. 22. of Angina, *i.e.* the Quinſie, *ibid.* chap. 24. of Strumæ in the Neck, and the Dropſie in the Throat, *ibid.* chap. 25. of the Inflammation of the Lungs, *ibid.* Part 2. chap. 3. of the Tubercles of the Lungs, *ibid.* chap. 9. of the Inflammation of the Midrif, *ibid.* chap. 13. of the Tumors of the Diaphragm, *ibid.* chap. 14. of the Pleureſie, *ibid.* chap. 16. of Gibboſity, *ibid.* chap. 12. of the Inflammation of the Stomack, Book 3. Part 1. chap. 12. of the cold Tumors of the Stomack, *ibid.* chap. 13. of the Inflammation of the Inteſtines, *ibid.* Part 2. Sect. 1. chap. 2. of the Tumors of the ſtraight Gut, and in ſpecial of the Hæmorrhoids, *Condylomata* (ſwellings in the Fundament ſo called) Thymi and Ficus, *ibid.* chap. 10. of the Inflammation of the Meſentery, *ibid.* Part 3. chap. 4. of the Tumors of the Cawl or Kel, *ibid.* chap. 7. & 8. of the Inflammation of the Spleen, *ibid.* chap. 5. of the Scirrhus of the Spleen, *ibid.* chap. 6. of the Inflammation of the Liver, Book 3. Sect. 1. chap. 4. of the Scirrhus of the Liver, *ib.* chap. 5. of the Dropſie Aſcites, *ibid.* Part 6. Sect. 2. chap. 3. of the Inflammation and Tumors of the Reins, *ibid.* Part 7. Sect. 1. chap. 8. & 9. of the Inflammation of the Bladder, *ibid.* Part 8. Sect. 1. chap. 4. of the Tubercles in the Urinary paſſage, *ibid.* chap. 9. of the Tumors of the Teſticles, *ibid.* Part 3. Sect. 1. chap. 3. of the Rupture and Tumors in the Scrotum or Cods, *ibid.* chap. 7. of the Tubercles & Warts of the Yard, *ibid.* chap. 9. of the Inflammation of the Navel, *ibid.* Part. 10. chap. 3. of the Inflammation of the Muſcles of the Abdomen, *ib.* chap. 9. of the Puſtules of Womens Privities, Book 4. Part 1. Sect. 1. chap. 4. of the Condylomata of the Womb, *ibid.* chap. 5. of the Warts of Womens Privities, *ibid.* chap. 6. of the Cancer of the Womb, *ibid.* chap. 11. of the Dropſie of the Womb, *ibid.* Sect. 2. chap. 11. of the Tumor of the Womb from Blood, *ibid.* chap. 12. of the Inflammation of the Womb, *ibid.* chap. 13. of the Scirrhus and Cancer of the Womb, *ibid.* chap. 14. of the Tumors of the Teſticles in Women, *ibid.* chap. 20. of Cruſta Lactea, Achores, and Favi, Tract. of the Diſeaſes of Infants, Part 2. chap. 3. of Tinea, *ibid.* chap. 5. of Hydrocephalus, *ibid.* chap. 6. of Siriaſis, *ibid.* chap. 7. of Aphæ, *ibid.* chap. 13.

Touching the flatulent Tumors, we have likewiſe (in ſpecial) treated of them in our former Books: to wit, of the Inflation of the Eye-lids, in the firſt Book of our Pract. Part 3. Sect. 2. chap. 2. of the Inflation of the Stomack, Book 3. Part 1. Sect. 1. chap. 11. of the Colick pain, *ibid.* Part 2. Sect. 2. chap. 4. of the Inflation of the Spleen, *ibid.* Part 4. chap. 4. of the Inflation of the Liver, *ibid.* Part 6. Sect. 1. chap. 3. of the Tympany, *ibid.* Part 6. Sect. 2. chap. 4. of the windy Rupture. *ibid.* Part 9. Sect. 1. chap. 7. of Satyriaſis and Priapiſmus, *ibid.* Sect. 2. chap. 3. of the Inflation of the Womb, Book 4. chap. 10. of the Inflation of the Head, Tract of Infants Diſeaſes, Part 2. chap. 6.

Touching thoſe Tumors that ariſe from the ſoft parts when they are removed out of their own proper places, we have likewiſe ſpoken of them, in ſpecial; and firſt of all, of the falling down of the *Uvea*, in the firſt Book, Part 3. Sect. 2. Chap. 25. of the *Hernia* of the Inteſtines, Book 3. Part 2. Sect. 1. Ch. 6. of the Umbilical *Hernia*, ibid. p. 10. Ch. 2. of the falling forth of the Womb, and the Uterine *Hernia*, B. 4. Part 1. Sect. 2. Chap. 16. and 17.

Of the Atrophy in general.

And moreover as touching the Scorbutick Atrophy, we have written ſufficiently therof in its proper place. But now whereas we have in the general ſpoken of the augmentation of magnitude in the whol body, and in general (above Chap. 4.) thoſe things therefore which may in general be further ſpoken of the Atrophy, we think it not amiſs to ſubjoyn them here in this place.

Certain peculiar Species of an Atrophy.

When the Body is not nouriſhed ſo much as it ought to be, but is diminiſhed and leſſened by reaſon of the denying of food unto it, this may indeed in the general be called an Atrophy. But yet notwithſtanding the peculiar Species of an Atrophy have likewiſe their peculiar names. That which proceedeth from the Ulcer of the Lungs is properly called *Phthiſis* and *Tabes*: that that is from an Hectick Feaver is named *Maraſmus*, and *Marcor*. And that which happeneth without theſe cauſes, is called in general, *an extenuation of the Body*. We here in this place uſe the word Atrophy in a general ſignification; and under it we will comprehend all and every preternatural Extenuation of the Body, by reaſon of the defect of Nutriment.

Atrophy in general what it is.

But now an Atrophy is twofold; the firſt is of the whol Body; the other of ſome one particular part, as of the Arm, the Foot, &c. The Atrophy of the whole (in general ſo taken) is a preternatural extenuation of the whole Body, by reaſon of its being fruſtrated of its food, and its being denied its due and requiſite Nutrition.

The Cauſes.

As touching the Cauſes of an Atrophy, this in the firſt place is to be taken notice of, viz. that the Cauſe that invadeth the whole body is either in its own quality and diſpoſition according to Nature, or elſe it is preternatural. And then likewiſe that which is Natural, or according to Nature, is the *Maraſmus* (as we cal it) in old age, and in aged Perſons. For there was never yet that living Creature born, or brought forth, that was not obnoxious to old age, and which in old

age did not wither and consume away. But since that this Atrophy cannot by any Art whatsoever be prevented; we wil therefore in this place speak only of that Atrophy which happeneth preternaturally unto some Bodies alone, and not unto all in general.

1. *By reason of the Nutriment.*

But now, whereas there are two things that concur and are necessary unto Nutrition, to wit, Nutriment, and the nourishing faculty; in both these likewise the Cause of Nutrition diminished (and consequently of an Atrophy) is to be sought after. In regard of the Aliment, the body consumeth and wasteth away, by reason of its either defect, or vitious quality, which we may cal its pravity. For if there be not dayly as much of this Aliment again taken into the body, as is every day insensibly discussed, then the body wasteth. But if there be indeed a sufficient store and stock of blood treasured up in the Veins; yet notwithstanding this is vitious and naught: and either it is not at all attracted by the parts; or if it be attracted, yet can it not be assimilated. The body is exenuated and pineth away, in the defect and want of Food and Nutriment, when in place of that Substance that is dayly wasted and diffused by an insensible transpiration, and exhalation, there is no other Nutriment, or at least not a sufficient store thereof, substituted and supplied. Now whereas the blood is the proxime and nigheſt Nutriment of the whole body; there the Nutrition is especially hurt through the defect and failing of the blood. Now the blood faileth (first of all) in regard of some default and error in the first Concoction; when there is not a sufficient quantity of Chyle (from whence the blood ought to have its original) generated and bred in the Stomack: and this may happen unto such as are sound and in perfect health, by reason of a dayly and continued scarceness of Food, and their frequent spare Diet; but it happeneth in such as are sick and unhealthy, when by reason of the want of appetite (it being now much dejected and weakned) they are averse from all kind of Food, and refuse to take any; or else when by reason of their Disease they are fed with but little Food, and that likewise not much nourishing. Which may also happen, if the Food that is taken in be presently sent and driven down into the Guts (either Crude or Raw, or else turn'd into Chyle) and so is by the Belly ejected, without its ever coming unto the Liver. The same may likewise happen if (by reason of any Disease whatsoever in the Stomack, its Concoction being thereby much weakned) the Chyle that is generated be either but little in quantity, or (that which is as bad or worse) imperfect and not sufficiently elaborated. Moreover Nutrition may be hindred because of the hurt of the sanguifying faculty, to wit, when by reason of something amiss in the Liver or Spleen, the blood that is generated is impure, and not good: and this cometh to pass in the *Cachexy*, *Leucophlegmatia*, *Tympany*, the Dropsie *Ascites*, the *Scorbutick* atrophy, and the long lasting Scabbiness. Now as for the Causes of Sanguification, they have been already (in the third Book of our Pract.) mentioned and explained. From whence it happeneth, that albeit there be a sufficient quantity of Food taken into the body, yet notwithstanding there followeth no Nutrition; and this again happeneth for two Causes, to wit, because either there is no aliment appointed by Nature for the nourishing of the parts; or if there be any appointed for this purpose, yet notwithstanding it cannot be rightly assimilated. There is no aliment appointed unto the parts, either because the Chyle is not so exactly elaborated in the Stomack that it may be converted into good blood; or else, because although the Chyle be sufficiently and rightly elaborated in the Stomack, yet by reason of some fault in the Liver it is not converted into good blood; or else because, that although there be Chyle generated in the Stomack, and that accordingly blood be bred in the Liver; yet it is oftentimes discussed and wasted by some certain Causes; such as are overmuch exercise, Watchings, Cares, Griefs, and Diseases, which melt away, dissolve, and discuss the aliment; so that there is too great an evacuation hereof by the Belly, by Sweats, and by the flux of Blood; and such likewise are, immoderate Rest, Meats and Medicamens that dry excessively, Fevers, especially such of them as are acute and Malignant. But the Nutriment is not rightly assimilated by the parts, in regard of some vitious quality it hath in it, by reason of which it cannot be assimilated by the parts; and so likewise the Nutrition may be frustrated by some external error; or else by reason of the Object, to wit, because the Blood is such that it cannot by the nourishing faculty be perfectly overcome and assimilated.

2. *In regard of the nourishing faculty.*

But now in regard of the faculty, there is not a sufficient Nutrition, by reason of some defect and want of native heat, and radical moysture. For Nature maketh great use of this Native heat, as of the next instrument in nourishing. And this especially happeneth by reason of the preternatural affects of the Heart, and principally its heat and driness; whether it be that the Heart be primarily affected (as it is in the Hectick Fever) or else that it suffer through some default of the neighboring parts, as it happeneth in the Ulcer of the Lungs. For whereas the nourishing faculty (as we said erewhile) maketh great use of the innate and Native heat (as its principal Instrument) in retaining, Concocting, agglutinating, and assimilating, and it being so that the innate heat is cherished by the heat that floweth in; if the temper of the Heart be not right, and as it ought to be, then the heat that floweth

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in, and consequently the innate heat likewise wil be much amiss, and not rightly tempered; and so it can be no fit Instrument of the nourishing Faculcy. And that that Hectick Feavers do but slowly and sensibly bring to pass, this the burning and melting Feavers accomplish in a very short time; by the heat whereof not only the aliment and substance of the body is consumed and melted away, but likewise the temperament both of the Heart, and also of the whol body is converted into that which is more hot and dry. The same happeneth by reason of over hard labors, cares, long continued diseases; and in general, al causes that are able to consume the Radical moisture, and weaken the Native heat.

The subject: Now this Atrophy happeneth especially in the softer parts, the fat and the flesh; and indeed the fat is first of al wasted; and then afterward the flesh is likewise extenuated. But now as for the harder parts (such as are the Membranes, Cartilages, and especially the Bones) although these may also in the like manner be dried; yet notwithstanding they cannot possibly be so extenuated and diminished, that thence the whol body should decrease. And hence it is likewise that the said extenuation and Atrophy of the body doth appear especially in those parts in which there is much fatness, and where there are more or greater Muscles, as in the Eyes and Temples.

The particular Atrophy The Atrophy that happeneth in the parts is various; It happeneth oftentimes privately in the Limbs, the Arms, and the Thighs. And hither belongeth the Atrophy of the Eye.

The causes thereof, which are the same As for the Cause of the particular Atrophy, like as the Causes of the Atrophy of the whol body consist in some one principal Bowel, whose action is necessary for the nutrition of the whol Body, or is indeed universal, and such as may exsiccate and dry the whol body: so in like manner the particular Atrophy of any one part hath a private cause, or at least such a one as belongeth unto that particular part. Yet notwithstanding the Causes are the same as of the universal Atrophy, to wit, the weakness of the Nutritive Faculty, and the defect of Aliment. The Faculty is hurt when the part is over cooled, and left destitute of its proper heat. For if this happen, the part can neither attract, nor retain, nor alter, nor assimilate the Aliment. Now the part is refrigerated, and the heat decayed, and rendered dul, and unfit for action, not only from the external Air, as also from cold water; but likewise it may proceed from overmuch rest, in the Palsie, or else from the streightness of the passages through which the Spirits flow in.

The weakness of the Nutritive Faculty.

The defect of nutriment The Nutriment faileth especially by reason of the narrowness of the passages through which it floweth unto the part that needeth it. And this happeneth for the most part from external causes, when the Veins that carry the blood unto the part for its Nutriment, are pressed together by the bones when they are loosened and out of joynt, or else from some certain Tumor that is nigh unto it, or by the brawniness and hardness of the flesh; or else lastly, when the Veins that convey the Nutriment are cut in sunder. See likewise *Galen*'s Book of *Marcor*, a Species hereof, arising from an Hectick Feaver.

Signs Diagnostick.

The extenuation of the whol body, as likewise of some one particulart part thereof, is visibly apparent to the sight, so that there wil be no need of many signs. For if the whol body be greatly wasted by an Atrophy, then the Face fals away, and becometh lean, the Temples fal down, the seat of the Eyes is rendered hollow and deep, the Nostrils become sharp; and such kind of Face (because that *Hippocrates* describeth it in his Prognosticks) they commonly cal an *Hippocratical* Face. Al the Ribs are conspicuous, the shoulder blades and the Chanel bones stick out, the Neck is extenuated, and the *Larynx* (or the top of the rough Artery) buncheth forth; the Belly falleth down, the Buttocks become withered and weak, the Thighs, Arms, Hands, and Feet, are emaciated and grow lean. But in regard that the Atrophy hath its dependance upon many and several causes, they are therefore al of them to be inquired into, that so the Cure of them may the more rightly be proceeded in. And therefore enquiry must be made whether external Causes, to wit, fasting, cares, grief, over hard labor, and the like, went before. If we find no such thing, we are then to make enquiry into the internal Causes; to wit, whether there be present a Hectick or any putrid Feaver, or whether there had not been one a little while before; and likewise a discovery must be made touching the Stomach, Spleen, and Liver; in what state and condition they are: for by the Diseases of the Bowels it may easily be known what the Cause of the Atrophy is.

Prognosticks.

1. By how much the more the Atrophy is but recent and newly begun, by so much the more easily it is cured; but by how much the longer it hath continued, by so much the more difficult it is to be cured.

2. When only the Alimentary humor is consumed, there is then hopes of an easie and speedy Cure: but that Atrophy is more difficulcly cured, in which the substance of the flesh is already wasted; and most difficult of al, when the Membranous and fibrous parts are already exsiccated and extreamly dried. Yea, such an Atrophy can no

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more be cured than that Atrophy that befalleth all persons whatsoever that live unto an old age.

3. If the Native heat be not as yet so far forth weakened but that it may possibly be repaired, there is then some hopes of recovery; since that the Cause being removed, and the heat restored, there may be nutrition again procured unto the body.

4. And therefore we altogether conclude, that from the Causes especially we are to conjecture what we are to hope for as touching the Cure. For if those causes may be taken away and removed, there is then some hopes of the recovery of health; but if they may not, there is likewise then no hopes of safety.

The Cure.

As for what concerneth the Cure of an Atrophy; when the Body is over dried, and that the Atrophy dependeth upon the defect and failing of Nutrition, it sheweth that then humectation or moistening of the body is first of al to be procured. Now the body is moistened, if we do our endeavor that the Aliment may be drawn forth out of the Veins unto al the parts of the body; and that being attracted it may be retained and assimilated by the parts of the body. But first of al, all the Causes, whether they be evident and external, or internal, they are to be removed. And therefore if fasting and hunger went before, let fitting food be again administred; if overmuch labor, sollicitous cares and troubles of the mind, and the like, these al of them are to be removed. For these Causes being taken away, and convenient food being exhibited, the body is easily restored.

In those that are sound.

But in those that are sick, if by reason of the dejected apperite, and some disease, either the Aliment be consumed, or the Faculty weakened; that disease being removed, and the sick person taking food again, the restauration of the body followeth. But now for the curing of the diseases of the Stomach, Liver, Spleen, Lungs, and in what manner these and the like Diseases are to be removed, we have abundantly taught you in our Practical Physick. From whence this likewise appeareth very plainly, that it is but in vain for us to use our utmost endeavor for the nourishing of the body, whiles the body is replenished with vitious humors; *For the more we nourish impure bodies, the more we hurt them,* as *Hippocrates* tels us in the second Book of his Aphorisms, Aphor. 10. For even the good juyces and meats are likewise corrupted by the said vitious humors, and so the Cacochymy is augmented. And therfore these bad and offensive humors are first of al to be prepared and evacuated. And this is altogether true in the Cure of al and every Atrophy, that our main care and regard must be in reference unto the cause upon which it dependeth; and that our first and chief pains must be bestowed in the removal thereof: and afterwards we are to bethink our selves how the extenuated body may again be fetcht up and restored by Aliment. There ought also to be great care taken, that this very restauration of the body be rightly accomplished. And therefore first of al there ought to be given Aliments that are soon and easily concocted; and next of al, such as do a little nourish, although they be more difficultly and slowly concocted. Unto such as are free from Feavers and Obstructions, and that are not troubled with any pain in the Head, neither have their Hypochondria distended, Milk may very fitly be allowed; Womens Breast Milk especially, then Sheeps Milk, thirdly Cows Milk, adding thereto a little Sugar; as also the juyces and Broths of Flesh, as of Partriges, Hens, and Pullets, Capons, Wether Mutton, Veal, together with Bread; and especially those Broths that they cal consummate and restoring Broths. Those Emulsions likewise are singularly good that are made of Almonds, Barly, with Wheaten flour. But this is especially useful (and here in this case much approved of) that is made of the bruised pulpy flesh of a Capon, Almonds, Sugar, Milk, and the flour of Rice. They likewise here very much commend the Indian Nut; and they write, That by the alone use hereof extenuated bodies have been fatned. In a cold *Marcor* Wine is allowable, and may benefit; but in a hot and torrid *Marcor* it is altogether to be avoided.

A note touching the manner of refection.

But now in the manner of Refection and Nutrition, *Hippocrates* his seventh Aphorism of the second Section is to be observed. *Those Bodies* (saith he) *that have been a long time extenuating, are slowly and by degrees to be repaired again; but those that have had but a short time for their wasting, must in as short a space be restored to their wonted fleshiness.* For (as *Galen* explains it) those bodies that are in a short time extenuated, they suffer this, not from the colliquation and melting of the solid parts, but from the evacuation of the humors and the spirits: but those bodies that have been long extenuating, in those the very flesh melteth away; and the other parts likewise (by which the concoction and distribution, and sanguification is perfected in the whol body) are rendered and made lean: wherefore there cannot be so much aliment concocted as the body stands in need of. And because of this we are to take the longer time in the refection and repairing of such like decayed bodies, and their Nutriment must be but thin and spare; this spareness of Nutriment being by *Hippocrates* termed slowness in nourishing. But as for such as have only their humors and spirits evacuated, in these we may safely and without any the least danger cause a speedy and ful refecti-

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on and reſtauration; in regard that the ſtrength of the ſolid parts ſerveth here for a firm foundation.

The friſtions and baths that are to be adminiſtred

After ſleep, gentle Friſtions may be inſtituted, the hands being firſt anointed over with the Oyl of ſweet Almonds. A Bath of Waters is likewiſe very uſeful: for it evidently moiſteneth thoſe that are over dried; as we may eaſily perceive in ſuch as have travelled long in the hot and ſcorching Sun, or elſe have been over exerciſing themſelves any other way, and thereby are made over hot; as alſo in ſuch as have their moiſture overmuch dried up by watchings, cares, or by any other waies and means. And *Galen* is very frequent in the mentioning of Baths; which here and there he largely treateth of; inſomuch that unto us (who have no ſuch great regard unto baths) he may ſeem ſomthing too curious. But at this very day many in *Aſia* do imitate the Care and Cuſtom of the Romans in their bathings; and theſe Aſiaticks place almoſt al their whol delight in their Baths; imitating the magnificence of the Ancients in their ſtately ſtructures for this very purpoſe, and with emulation endeavoring to exceed them in this their luxury and prodigality. For there in their Baths are al things to be had that may poſſibly be deſired either for health or pleaſure; touching which ſee further in *Proſper Alpinus* his third Book of the Egyptian Medicam. Chap. 15, 16. and ſo the following, even unto the end of that Book.

The Cure of a particular Atrophy

But now as for the Cure of a particular Atrophy, *Galen* (in his Book of the Office of a Phyſician, Chap. 3. Text 32. and in his fourteenth Book of the Method of Phyſick, Chap. 16.) hath taken great pains to ſhew us in what manner it is to be performed. For whenas the private parts do wither away, and are extenuated by reaſon of the hinderance of the afflux of the Aliment, and the languiſhing heat of the part; the Phyſitian ought then to uſe his utmoſt endeavor, that ſo ſtrength and heat may again be reſtored unto the part, and that the afflux of blood unto the part may again be procured. Thoſe means that reſtore ſtrength and heat unto the part, are, a gentle and moderate rubbing of the Member, Motion, and the ſuppling of it with warm water: the ſame means do likewiſe draw and allure the blood unto the part. Now this friction, and ſuppling with warm water ought ſo long (and no longer) to be continued until the part be made ſomwhat red, and be as it were a little ſwoln, but not ſo long, until it be again aſſwaged and fallen. The parts may likewiſe be fomented; or (if their condition wil beat it) even ſoaked and bathed in baths made of Sage, the tops of Juniper, Lovage, Lavender, Mallows, and Marſh-mallows; with which when the part is ſufficiently fomented, it may afterwards be anointed with Oyls or convenient Unguents.

Unguents.

There are many ſuch like Unguents and Emplaſters to be had: as for inſtance,

Take *Unguent Dialthæa, Aragon, and Martiatum, of each one ounce and half; Oyl of Lawrel, of Spike, and of Caſtoreum, of each two drams; Mingle them and make an Unguent.* Or,

Take *Mans Fat, the Yew Tree, of each as much as you wil, the Pouder of Savine as much as will ſuffice, and make an Unguent.* Or,

Take *Bdellium, Opopanax, of each one ounce; Diſſolve them in Wine, and ſtrain them. Then add of Hogs fat three ounces; Gooſe fat and Hens fat, of each one ounce; Oyl of old Olives four ounces; Turpentine and Wax, of each one ounce; mingle them over the fire, and boyl them until the Wine be conſumed: and at length add of the Pouder of Maſtick, Frankincenſe, and Fenugreek, of each one ounce, and make an Unguent.*

Emplaſters.

There may likewiſe ſuch a like Emplaſter be impoſed: Viz.

Take *Wax, Roſin, Turpentine, of each one pound; mingle them upon the fire; and afterwards add, of Maſtick, Frankincenſe, Galbanum, Saffron, long Pepper, Cinnamom, Nutmeg, Mace, Cloves, Zedoary, Galangal, Ginger, Grains of Paradiſe, and Nettle ſeed, of each half an ounce; and make an Emplaſter.* Or,

Take *the Leaves of Lovage freſh and new, the tops of Savine, and Juniper, of each two handfuls; Camomile flowers half a handful; Juniper Berries half an ounce; when you have ſliced and bruiſed them wel, then pour upon them the Oyl of Bayes, and Lillies, as much as wil ſerve to cover them all; of Hogs Greaſe three ounces; of Wine two ounces; boyl them until all the moiſture be waſted; and then add Oyl of Spike, and Juniper Berries, of each one dram; Muſtard ſeed poudered one ounce; the Root of Pellitory three drams; Muſtard two drams; Wax as much as will ſuffice, and ſo make a Liniment.*

A Fomentation.

For thoſe that are offended by Remedies that are fat, they may have a Fomentation made of the Water following, wherewith the Member may be bathed; Viz.

Take *Caſtoreum one dram; long Pepper, Pellitory, Grains of Paradiſe, of each two drams; the Berries of Spurge-Olive, (by the Greeks called* Coccognidia) *or of Nettle half an ounce; Rocket one dram and half; Juniper Berries one handful; Sage, Mint, Organy, Mother of Thyme, St. Johns wort, of each one handful; Spirit of Wine three pints, deſtil them; or at leaſt let them ſtand infuſing a long while, to wit, for ſome certain daies time; and afterwards let them be ſtrained.*

Dropax.

Dropax.

After this, the Ancients did also on the fourth day administer those Remedies that were vulgarly called *Pications*. Now a *Dropax* or *Pication* was a Medicament that they made of Pitch dissolved in Oyl, with which blood-warm they made a Liniment for the extenuated part, and there they kept it on until it was cold; then they removed it, and applied a fresh one; and this was often repeated, until at length the part became red, and turgid or puffed up. Then after this, the Pication being removed, they anoynted the Member with the Oyl of sweet Almonds, or some kind of fat; and in the Evening the same was repeated as before; and in this manner they handled the part so long, until it again waxed thicker.

Epicrusis, and Catacrusis:

Which if they could not effect by the said pication, the Ancient Greek Physitians then made use of a Remedy, that was by them termed *Epicrusis* and *Catacrusis*, *i. e.* a *Percussion*. For they smote the lean part with certain Ferula's (provided purposely for this use) untill such time as the part became turgid, swoln and red; and then immediately thereupon they anoynted it with some fat Medicament or other: but our Physitians for these Percussions do make use of those Nettles that are Green and Stinging.

THE FIFTH BOOK.

THE SECOND PART.

Of Ulcers.

Chap. 1. *Of the Nature and Differences of an Ulcer.*

ALthough the word *Helcas*, *Ulcus* (an Ulcer) be in general taken for every solution of Continuity in a soft part, as we may see in *Galen* his thirteenth Book of the Method of Physick, Chap. ult. where he under the same signification comprehendeth likewise a Wound that is properly so called, in which manner *Celsus* in his fifth Book, and Chap. 6. doth oftentimes without any difference at all take both a Wound and an Ulcer: yet notwithstanding properly & in special, the solution of Continuity with magnitude diminished, in a soft part, having its original from a corroding matter, is called an Ulcer. To wit, a Wound and an Ulcer differ in this, that in a Wound there is only a solution of Unity, but there is not any thing of the part necessarily lost; but in an Ulcer there is something diminished and lost from the part affected; and if nothing else, yet at least the Scarf-skin. For seeing that an Ulcer is always from a corroding Cause, it cannot possibly be but that something must be taken away from the part. For although in an Ulcer there be sometimes some kind of superfluous flesh growing forth; yet notwithstanding there is nevertheless the Skin, yea and the very natural flesh it self wanting: and that Ulcer is no simple and single Disease, but a Compound one, & such as is conjoyned with magnitude augmented. There may likewise together with an Ulcer be conjoyned divers other Diseases, a Distemper, an Inflammation, an *Erysipelas*, an Excrescent Flesh, and other Diseases, which yet notwithstanding belong not unto the Essence of an Ulcer, but may be taken away the Ulcer still remaining; the essence whereof doth consist only in the solution of Continuity, together with some kind of diminution of the part affected.

An Ulcer what it is properly.

The Subject of an Ulcer is a part soft or fleshy, the word Flesh being here taken in a large acceptation; *viz.* not only for the Muscolous flesh, but for that likewise that comprehendeth the flesh, of which the Intestines, the Bladder, and other of the Bowels consist; and herein lieth the difference between it and the rottenness that is in the Bones.

The Subject:

The Causes.

The neerest Cause is any matter whatsoever it be that hath in it any corroding quality; which comprehendeth under it not only the sharp humors that are bred in the body, but likewise all those external Causes that have in them a corroding power, such as are corroding Medicadicaments and poysons: for it is false (that which some assert) that the very same Ulcers arise only from internal Causes; since, that experience teacheth us, that the very same Ulcers may be excited also from external Causes. And so (*Galen* himself being witness in his fourth Book of the Method of Physick, and Chap. 9.) it is most apparently known even by experience it self, that by the Fire, scalding hot water, Oyl, and other the like fervent juyces, in burnings and scaldings, they are not Wounds that are excited, but Ulcers; like as also Medicaments, and Poysons that cause putrefaction and burning, excite Ulcers. And so poysonous and contagious vapors breed Ulcers; like as Scabbiness by contagion and infection breedeth Scabbiness;

Scabbineſs; to wit, whileſt the Contagion that is imparted and communicated unto the Skin, corrodeth it. And in the very ſame manner the vapors that are drawn in (by breathing) from the Lungs of Phthiſical Perſons do exulcerate the Lungs, and by contagion do breed a *Phthiſis* or Conſumption. And in the like manner, upon the very ſame ground, Venome and Venereal Poyſon being rub'd and chaf'd into any body, or by any means communicated thereunto, infecteth and exulcerateth the ſame. Neither is it of any weight or moment, that *Euſtachius Rudius* endeavoreth to reduce ſuch like Ulcers as theſe rather unto Wounds then unto Ulcers. For by this means he confoundeth altogether the Difference that is betwixt Ulcers and Wounds; in regard that Ulcers & Wounds do not differ only in this, that Ulcers are evermore with a loſs of ſome of the ſubſtance, whereas Wounds may be without any ſuch loſs; but likewiſe, in that Wounds ariſe from ſome Cauſe that either cutteth into the part, or pricketh it; or breaketh, or bruiſeth it; but theſe, to wit, the Ulcers, proceed from a Corroding Cauſe, whether it be external, or whether it be internal. And this is alſo manifeſt in Medicaments that putrefie (for who can deny that to be an Ulcer that is excited from the *Juyce* of *Spurge*?) from the which ſaid Medicaments that Contagion that is in *Scabies*, the French Pox, and the *Phthiſis* or Conſumption, differeth but very little. For although (as *Rudius* there Objecteth) we do not deny that ſuch like Poyſons have likewiſe in them a power of infecting the humors, which being corrupted may afterward alſo promote theſe Ulcers: yet notwithſtanding we ſay, that all power whatſoever of corroding is not to be denied unto this very Contagion it ſelf, although afterward (when the corruption of the humors happeneth in the body) the increaſe of the Ulcer be thereby much promoted and furthered.

The Differences.

The Differences of Ulcers, ſome of them are Eſſential, others of them only Accidental. The Eſſential are thoſe that are taken from the very form of the Ulcer, from the Subject, and from the efficient Cauſe thereof. Thoſe that are taken from the form of the Ulcer are drawn from its figure, its magnitude, and the like. For ſome Ulcers are great, others but ſmal; ſome of them long, others ſhort; ſome of them broad, others but narrow: ſome ſtraight, others again oblique, wreathed in, and fiſtulous; ſome of them equal, in which the fleſh in all the parts of the place affected is equally waſted; others unequal, in which there is a greater part of the fleſh conſumed in this place, and a leſs portion in another place of the ſame Ulcer. From the part affected ſome Ulcers are ſaid to be External, others Internal; ſome ſleight and ſuperficial, others of them profound and deep; and they may be in this, or in that part. The Differences ariſing from the Cauſes ſhall be ſhewn in the next following Chapter, wherein our purpoſe is to treat of the Cauſes of Ulcers.

But now the Accidental Differences of Ulcers are thoſe that are taken from ſuch things as are without the Nature & Conſtitution of the Ulcer; and they are ſuch as are taken from the ſcituation of the Ulcer, or elſe from their time; viz. that ſome of them are Recent and new; others of them old and inveterate.

And hither likewiſe there may not unfitly be referred thoſe Differences that are taken from Cauſes accidental, and ſuch as are not common unto all Ulcers; to wit, that ſome Ulcers are joyned together with a fluxion, but that others of them want the ſaid afflux; that ſome of them are pure, others of them ſordid and foul, corroding, eating up, and Creeping along. For theſe Differences depend upon the Cauſes. And hitherto likewiſe belong thoſe Differences that are taken from the Accidents and Symptoms of the Ulcers; to wit, that ſome of them are altogether void of pain, others of them accompanied with a pain, an itching, pricking, and burning; ſome of them eaſie to be cured, others difficult and rebellious, by the Greeks called *Dyſepulota*; ſome of them benign and favorable, others ſuch as have contracted a moſt peſtilent and malignant quality. And hither likewiſe are to be referred thoſe Ulcers that they commonly call *Chironia* and *Telephia*. And yet nevertheleſs beſides theſe Differences, that may be properly called ſuch, there may yet ſome others be given, that are improperly ſo called; and ſuch as may rather be termed the Complications of Ulcers with other Diſeaſes, then Differences; and ſuch like Differences are theſe, to wit, that ſome Ulcers are conjoyned with Pain, a Diſtemper, a Phlegmone, a Callous or Brawny Fleſh, a Gangrene, a *Cancer*, Worms, and the Rottenneſs or Corruption of the Bones.

And (the truth is) the Differences and Diſtinctions of Ulcers are drawn from the Springs aforeſaid. But it being a truth likewiſe that ſome of the ſorts of Ulcers are taken and drawn from divers and ſeveral Fountains (that ſo we may not treat of Ulcers without any Method) I conceive that our Diſcourſe touching theſe Ulcers will be moſt Methodical if we handle them in the order following; to wit, 1. If we firſt of all treat of a ſimple Ulcer, or an Ulcer conſidered in the General. 2. Of an Ulcer with a Diſtemper. 3. Of an Ulcer with an afflux of humors. 4. Of a ſordid and foul Ulcer. 5. Of an Ulcer with Tumors. 6. Of Fleſh growing forth luxuriant and proud. 7. Of an Ulcer that is wan or Leaden coloured, and withall Callous. 8. Of an Ulcer that is hollow, and fiſtulous (which we commonly call the Fiſtula.) 9. Of an Ulcer with Worms. 10. Of an Ulcer with a rottenneſs of the Bones. 11. Of the Ulcer by the Greeks called *Dyſepulot*, Malignant, the Ulcers *Telephia* and *Chironia*, and *Phageda-*

na. 12. Of pain with an Ulcer. 13. Of the Ulcers of the Legs and other parts. 14. Unto which we wil add something touching Burnings. 15. We wil conclude all with a short Discourse touching a Gangrene, and *Sphacelus*.

Chap. 2. *Of a simple, or single Ulcer.*

IN the first place therefore we wil handle a simple Ulcer; and shew you what are the Causes of an Ulcer considered in the general; and what differences it hath according to its form, its causes, and the place affected: by what signs the Ulcer and its essential differences may be known; and what is to be pre-advised as touching the cure; and what the Ulcer in general indicateth and pointeth out; and lastly, what kind of Method and course it requireth for the curing of it.

The Causes.

We have already told you in the precedent Chapter, that the neerest cause of an Ulcer is a matter that hath in it a corroding quality, whether it be bred in the Body, or whether it happen unto the body from without.

Of the first sort are al Humors whatsoever that are sharp, and endued with a corroding Faculty bred in the body. But now this humor is either bred without the part affected, or else it is generated in the very part it self that is affected. Without the affected part there is generated a cholerick humor, a salt flegm, a Whey that is salt, nitrous and sharp, and black Choler or Melancholy. For these if they be bred in the body, and flow unto any one part, they may corrode and exulcerate the said part. But from what Causes such like humors may be generated in the body, we have already shewn you in the second Book of our Institutions, touching the causes of Diseases, and elsewhere. Now they flow unto the part affected, either by transmission, or by attraction; both which from what causes they proceed, we have declared above, in the first Part, and Chap. 5. of an Inflammation. And more especially in the Spring time, various Ulcers are wont to arise from some internal vice of the Humors, as likewise from unseasonable and immoderate exercises. *For if* (as *Galen* writeth in his third Book upon the Aphorisms, Aphor. 20.) *in the Spring the Body be impure, there happeneth indeed then some such like thing in the Spring time, even as we see there is wont to be in the exercises of the Body. For although these exercises be never so safe and healthful in themselves; yet nevertheles if you bring forth a man that is full either of flegm or yellow choler, or black choler, or even also of blood it self to exercise, you shal undoubtedly by this exercising of him procure unto him either the Falling-sickness, or the Apoplexy; or if not these, yet most assuredly the rupture of some Vessel in the Lungs, or a most acute and violent Feaver. But unto such as have had exercise enjoyn'd them, for the purging out of humors that lie low and deep, this their exercise drawing forth unto the skin a Cacochymy, that is to say, abundance of bad and offensive humors, and scattering it throughout the parts, doth for the most part excite and cause Ulcers, and the* Scabies *or Scabbiness. For this is that which* Hippocrates *hinteth unto us, when he saith, That if we exercise an impure and impurged body, Ulcers wil from thence arise. And so indeed in the very like manner, in the Spring time, the heat of the ambient Air dissolving the humors calleth them forth unto the skin, by an effect altogether like unto that of exercises. For the effects of the Spring do not only resemble the effects of Exercises, but they are also most like unto the works and operations even of Nature her self. For indeed the parts that the Spring time acteth (like as doth Nature her self) are, as wel to cause that occult and secret perspiration throughout the whol body (by the which all the superfluities of the body are emptied forth) as throughly to purge the body also by diseases, after a various and different manner.* Thus far *Galen*. But then these Humors get their acrimony in the part it self, by reason of some distemper in the said part. And after this manner, like as even the *Pus* or purulent matter it self, by its concoction and long abode in the part becometh more sharp, and stil so much the sharper and corroding, by how much the humor (out of which it is generated) is more tart and sharp; so likewise doth the blood, which is corrupted by the part affected, and so putrefieth.

But now the Causes that happen unto the body from without, are Septick (or putrefying) and Caustick Medicaments. Neither do I here exclude the very actual fire it self, from bearing a part in the number of the external causes; in regard that the Eschar that is left remaining appertaineth rather unto ulcers than unto wounds. And hither likewise is to be referred that contagion, by means whereof the vapors exhaling from the Lungs of Phthisical persons, & by others attracted & drawn in with the breath, do likewise exulcerate their Lungs, and so cause in them a *Phthisis* or Consumption; and also the nastiness and infections of such as are scabbed, Leprous, and affected with the foul Disease, being communicated unto the skin, do exulcerate it, and there generate a like disease. But that attraction which is caused in gauling & interfairing, or in wearing of the skin by the wringing and streightness of the shoo, is not rightly and fitly referred unto, and reckoned up amongst the nigheft and most immediate Causes. For by the said attrition the humor only is attracted, that afterwards corrodeth the Skin, and exciteth therein little bladders or blisters. But now what the special causes of special Ulcers are, we shal afterwards shew you in its proper place, where the peculiar causes of each particular Ulcer shal be explained.

Signs

Signs Diagnostick.

External Ulcers are visible and apparent both unto the sight and touch; neither need there any signs be given whereby they may be known. But as for the internal ones (that oftentimes lie hid) they are known by the Chirurgeons searching Instrument (or Probe) if way be made for it to pierce unto them; by the touch, or else by the excrements that come from them, by the pain, and by the hurt that the action hath received. For the excrements do shew forth and declare the part affected; and if by any passage whatsoever of the body (whether it be the Arse, or the Bladder, or the Nostrils, or the Ears) *Pus* or rotten filth and corruption floweth forth; or otherwise if it be rejected and cast up by vomit, or by coughing and spitting, it is a sure and certain sign that there lieth hidden within some kind of Ulcer; but then in what part it lieth hid, the property of the pain, and the scituation, and the action of the part that is hurt, wil teach and inform us. A pricking pain is a sign that the hurt and affected part is nervous; but a beating pain acquainteth us that an Artery is hurt. The seat of the pain wil in like manner manifest the part it self that is exulcerated. If in the exulcerated part the sense or motion shal be hurt, it betokeneth that the part affected is Nervous. If there be felt after meals a biting or twinging pain, it is a certain sign that the Stomach is exulcerated. External Causes do here likewise furnish us with signs: If any one hath drunk or eaten the Flies *Cantharides*, the Bladder will then be exulcerated; if he hath drunk any Medicament, or any thing else that burneth (as for instance, *Aqua fortis*, or the like) then the Jaws and the Stomach wil be exulcerated. See more hereof in the 3d Book of our Institutions, Part 2. Chap. 4.

Whether the Ulcer be great or smal, straight or oblique, or whether it be of any other figure (and so for al the rest of the like differences) in the external Ulcers they are known by the sight, and by the Chirurgeons Probe. But in al Internal Ulcers they cannot so easily be known. But yet nevertheless, whether an Ulcer be great or but smal, the store of filth and corruption that issueth out of it wil manifest; for in a greater Ulcer there wil be greater store of this *Pus*, or purulent matter, and in a less Ulcer there wil be less hereof.

Causes.

As for what concerns the Causes (and first of al the internal ones) if the Ulcer hath its original from the afflux of the humors, then there wil be present signs of a Cacochymy, either in the whol body, or else of a vitious and faulty constitution of the Liver, Spleen, or of some other Bowel. Which if they be absent, and do not appear, but that on the contrary there be present a distemper and weakness of the part affected, it is then a sign that the Cause of the Ulcer was generated in the part it self that is affected. But then what kind of Humor it is that causeth the Ulcer, whether Choler, or salt flegm, or a serous and wheyish Humor, or black Choler, wil manifestly appear from the signs of each particular Bowel; and especially by the *Pus* and rotten filth that floweth out; as also by the color of the Ulcer, and the pain thereof; by the pricking likewise and the twinging thereof; and the signs of special Ulcers wil also instruct us in the same.

As for the external Causes, they are known by the relation of the sick party, who wil acquaint us, whether he were hurt by any sharp and corroding Medicament, or by poyson, or even by the fire it self; or otherwise whether or no he hath conversed with any one that was diseased with these contagious Ulcers, and whether or no he were not infected by him.

The times of these Ulcers have likewise their signs. For when that which first issueth forth is wateriish, crude, thin, and great store of it, it is then in its beginning, which very beginning may likewise nevertheless be discovered by the sense, by the touch, and by the sight, as also from the causes of the Ulcers, both external and internal, and by the present and subsequent symptoms, the pain and itching. When afterward the *Pus* or rotten filthy matter beginneth to be better concocted, and that its store and plenty is diminished, then the Ulcer is said to be in its increment or increase. In the state the *Pus* is at the best; and in the declination of the Ulcer the *Pus* is most of al lessened and diminished. And yet nevertheless the same times are likewise known by the pain, by the itching, and by the hurt actions; which if they be augmented, we may then likewise conclude that the Ulcer is encreased; but if they remit and slacken, and that al things return unto their Natural state; they then demonstrate and shew that the Ulcer is then diminished, and in its declination. Which very thing may likewise be learned both by the sight and by the touch, in the external parts. But as for the signs of special Ulcers, they shal hereafter be propounded in their own proper places.

Prognosticks.

1. What is to be hoped for touching the Cure of an Ulcer, may be known by the greatness and heavines of the Ulcer it self, and the condition of the part affected.

2. For if the Ulcer seize only upon the Skin, and be only superficial, it is then the more easily, (and in the shorter time) cured: but by how much the deeper it is, and by how much the part that is affected is more noble, and to be preferred before the Skin, by so much the more difficult wil the Cure thereof be.

3. And in this regard, those Ulcers that are in the extremities of the Muscles are more dangerous

than those Ulcers that are in the middle of the Muscles.

4. And for this very cause, those Ulcers are more dangerous that are in a noble part, and do belong also unto a noble part; as also a Nerve, a Vein, or an Arrery. And in the general, the more internal Ulcers are altogether more dangerous than the exterior Ulcers.

5. Those Ulcers that are able to draw a principal part (or a part neer unto a principal one) into a consent and agreement with them, oftentimes cause death unto the sick person.

6. Those Ulcers are more easily cured, unto which the Medicaments that are to be administred do easily reach and attain unto, and more easily adhere and stick unto them: but those Ulcers are more difficultly cured, unto which the Medicaments cannot be rightly applied; and unto the which they do not so easily stick and adhere.

7. Ulcers are hardly cured in those parts that do naturally abound with many humidities and excrements.

8. And so are likewise those that are of an exquisite sense, and such as are able to draw into consent with themselves those parts that are endued with an exquisite sense.

9. As likewise they are necessarily altered by the external Air, or upon any other Causes.

10. Those Ulcers are likewise dangerous, and of long continuance, in the which the rottenness of the bones is to be feared.

11. A great Ulcer (all other circumstances being answerable) is more difficultly cured than a smal Ulcer. For in a great Ulcer many parts are exposed unto the external ambient Air, and the parts lying underneath (to wit, the Veins, the Arteries, and the Nerves) are more hurt. As also those Ulcers that are narrow and somwhat long are easily, but the round are hardly cured.

12. If the Body be pure, and the principal Bowels in good state and constitution, and if the part affected it self be otherwise wel and in a good temper, there is then hope of an easie cure. But on the contrary, if the Body be Cacochymical, the principal Bowels ill affected, and the part exulcerated likewise ill affected, we may then wel conjecture, that the Cure wil prove difficult, and that the Ulcer is like to be of long continuance.

13. And hereupon it is that those Ulcers that succeed other diseases are for the most part not cured without much difficulty, in regard that Nature thrusteth forth and transmuteth those vitious Humors that are in the body unto the external part.

14. And so it is likewise in those Ulcers that tend to a greenness or blackness of color; because that this signifieth that the heat of the affected part is very weak, and almost extinguished. And in those that are nigh unto death, a little before they die, the Ulcer appeareth pale, black and blue, or leaden colored, and withered, by reason of the extinction of the Native heat.

15. When after a long flux of bad and il colored filth and corruption, good and laudable *Pus* begins to appear, it affordeth good hopes of the recovery of health; and it is a sign, both that the strength of Nature is uniting it self together, and that the matter is changed and turned into better than it was before.

16. And the *Pus* it self doth altogether supply us with a sign and token whereby we may guess what hope there is of the Cure of the Ulcer. For if the *Pus* that is dayly thrust forth be good, it then yielderh unto us hopes of an easie Cure; but il and naughty signifieth the contrary. For good *Pus* signifieth unto us both the good condition of those humors out of which it is generated, and likewise the strength of the part affected: but bad *Pus* sheweth the contrary. Now the *Pus* that we are to account good, is of a middle consistence betwixt the thick and the thin, white, smooth, equal, and little or nothing noysom and stinking. But then the evil *Pus* is that which is very thin and fluid, pale, leaden colored, dreggy, and il favored.

17. The *Sanies* likewise it self (which is a humor somwhat thinner than the *Pus*, and more waterish) flowing forth from Ulcers, and likewise sometimes from Wounds, sheweth evidently what we are to hope as touching the Cure. For much *Sanies* that is over thin, pale, leaden colored, black, and stinking, and that which corrodeth the Skin that is nigh unto it, evidenceth that the Ulcer is hard to be cured. But if the said *Sanies* be but indifferently thick, not much of it, somwhat red, or something white, it then sheweth that the Ulcer may easily be cured.

18. *If the Ulcers be Annual* (viz. *such as return yeer after yeer*) *or of a longer continuance than ordinary, it wil then follow of necessity that the bone must impostumate, and that hollow Cicatrices must be made therein.* So saith *Hippocrates* in the sixth Book of his Aphorisms, Aph. 45. For if the Physitian take in hand the Cure of an Ulcer, and put forth the utmost of his art and skil in the prosecution of the same, so that he neither omit nor intermit any thing that is therein necessary, and yet nevertheless the Ulcer shal not after a long time be cured, or else being covered over with a Cicatrice shal become crude and raw again, it then signifieth that the cause why the Ulcer is not healed lieth in the bone that is corrupted: the continual afflux likewise of the excrements that are generated in a long lasting Ulcer may easily corrupt the bone that lieth underneath it. For by reason of the distemper of the part that hath been of a long time encompassed about and surrounded with an Ulcer, and by reason of the impostumated bone, the Cavity

vity of the Ulcer cannot be filled up, neither can there fleſh enough grow forth; from whence it is that an hollow Cicatrice is cauſed.

19. If the Ulcer after ſuch time as it is filled up with fleſh, and that a Cicatrice ought to have been brought thereupon, wax crude and raw again, there is then great cauſe to fear, that the Ulcer wil turn into a Fiſtula.

20. Ulcers that are in the Feet, and in the Hands, are wont ſomtimes to haſten on Inflammations of the Glandules in the Arm-pits, or in the Groins, and Tumors in bodies that are plethorical and cacochymical. For the matter flowing down unto the ulcer in the Hand, or in the Foot, thoſe very parts themſelves likewiſe being become more looſe and weak do firſt of al receive and drink it in.

21. The ulcers of the Thighs are for the moſt part hard to be cured, and eſpecially if they be cheriſhed by any diſtemper and default in the Spleen: for then the thick and melancholy humors that flow unto the ulcer do hinder the Cure thereof.

22. Ulcers that have continued long, and are now become inveterate, are not to be cured without much danger, unleſs the body be firſt of all carefully purged, and a good courſe of Diet be obſerved; of which very thing *Gulielmus Fabricius* (in his third Century, and Obſerv. 39.) giveth us an inſtance in a certain man, who having had an inveterate ulcer cured in his left Thigh by an unskilful and immethodical Empirick, after ſome few months was ſurprized with a Pleuriſie in his left ſide, upon which he died: and that during his ſickneſs he ſpit forth juſt ſuch ſtuff and excrements as before were wont to flow forth of the ulcer. See likewiſe *Ambroſe Parry* (in his ſeventeenth Book, and Chap. 51.) touching *Pus* likewiſe from an ulcer in the Arm evacuated by the Urine.

The reſt of the Prognoſticks ſhal be handled in the ſpecial differences of the ulcers.

Indications.

Since that the Eſſence of an ulcer conſiſteth in the ſolution of unity, and the diminution of the magnitude of the affected part; the ſolution of unity ſheweth that union muſt be endeavored, and that which is loſt and diminiſhed indicateth its own reſtauration: to wit, the ulcer (as an ulcer) is to be filled up with fleſh, and united, and then ſhut up with a Cicatrice. But then when the ulcer is conjoyned with its cauſe, that either excited the ulcer from the very beginning, or elſe if (in the Cure) it obtain the Nature of that cauſe without which the ulcer had not been, the ſaid cauſe is then firſt of al to be removed. But then it is requiſite likewiſe that the temper of the part affected, as alſo the blood that floweth thereto be ſuch as it ought to be: but if there chance to be any thing amiſs in theſe, it is to be corrected; touching which we ſhal hereafter ſpeak further in the ſpecial differences of Ulcers.

If therefore that Humor that excited the ulcer be ſtil preſent, it is to be evacuated: for in every affect in which the cauſe is ſtil preſent, the Cure is evermore to be begun from the removal of the Cauſe. And moreover, becauſe that in the beginning there wil alwaies fal forth ſome of the blood without their proper veſſels, and becauſe that oftentimes together with it other vitious humors in the body flow thither; leſt therefore that which ſticketh in the pores of the parts ſhould putrefie and breed an Inflammation, this blood is to be concocted, and changed into good and laudable *Pus*. From whence likewiſe it is that *Galen* in his Book of the times of the whol Diſeaſe, and Chap. 3. writeth that ulcers have their peculiar times; and that in the beginning there is thruſt forth a thin, inconcocted, and wateriſh *Sanies*, which in the augmentation by the help and benefit of concoction becometh thicker; and at length (in the ſtate) is changed into *Pus* that is good and white. And therefore in the beginning of an ulcer it wil be requiſite to uſe Concocters, which they commonly cal Digeſtives. And furthermore the filth and impurities which are wont to be generated in an ulcer (in regard that they hinder the curing thereof) are to be wiped clean away. So ſoon as the ulcer is cleanſed, the Cavity thereof is to be filled up with fleſh: and at the length the ulcer is to be ſhut up with a Cicatrice.

There is yet nevertheleſs likewiſe regard to be had unto the parts affected. For in the ulcers of the external parts, the green ruſt of Braſs, burnt Braſs, Vitriol, Antimony, and the like, have their place; which nevertheleſs are by no means to be admitted of in the internal parts. If likewiſe the part be ſo conſtituted and framed, that it may give a paſſage unto other things (like as the Gullet doth) the Medicaments are then ſo to be ordered, that they adhere unto the part. Thoſe parts that are endued with an exquiſite ſenſe wil not admit of ſharp Medicaments; which thoſe parts that are of a more dul ſenſe wil wel enough ſuſtain: touching which we ſhal ſpeak (here and there) in the particular ulcers.

But now how an ulcer may be filled up with fleſh, *Galen* teacheth us in his third Book of the Method of Phyſick, and Chap. 3. To wit, unto the generating of fleſh there are neceſſarily required the efficient Cauſe, and the matter. The efficient is Nature, which (as it doth in the whol body, ſo likewiſe) in each particular part doth attract and draw ſo much Aliment as is neceſſary, and there ſhe retaineth it, concocteth, applieth, and aſſimilateth it. The matter is a pure and ſincere blood, that is generated from meat and drink. But becauſe (in every concoction) there is generated a twofold excrement; (one more thin, that inſenſibly exhaleth, or elſe is diſcuſ-

ſed

sed by Sweat; the other more thick;) the same likewise happeneth in the generation of Flesh in the Ulcer; and if they be left remaining in the part, they wil moisten it, and hinder the generation of Flesh. And therefore these Excrements in the Ulcers are to be clean wiped away, and dried up. And this is that which is so frequently & commonly alleadged out of *Galen* (in his third Book of the Method of Physick, and Chap. 4. and in his fourth Book of the Method of Physick, and Chap. 5. and in other places, here and there) where he saith that every Ulcer requireth exsiccation. And *Hippocrates* (in the beginning of his Book of Ulcers) thus writeth: *That which is dry* (saith he) *commeth near unto that which is sound; but that which is moist cometh very nigh unto that that is vitiated.* And so the Cure of an Ulcer it is indeed the work of Nature, that restoreth the flesh that is lost from the Blood flowing unto the part, and bringeth a Cicatrice over the Ulcer being filled up with flesh. The Physitian he only removeth those impediments that are an obstacle to Nature in her operation, whilest he cleanseth away the Excrements, and drieth the Ulcer; and when he doth this, he is then said to generate Flesh, and to introduce a Cicatrice.

The Cure.

At the beginning therefore, if the body be plethorical, or Cacochymical, then the abundance of Blood is to be diminished, or the Body evacuated, lest that the humors flow yet longer unto the part affected. And withall let there likewise be a good and wholsome Course of Diet appointed unto the Patient, that so there may no more of these bad humors be generated in the Body. And for all those things likewise that we call not natural there ought to be such a course taken, that nothing unbefitting or inconvenient may happen, nor any hurt be offered unto the Ulcer.

Moreover in regard that it cannot well be, but that there wil somwhat of the Blood that is poured forth of the Veins, and something of the humors likewise stick in the Pores of the parts; that so therefore this may be Concocted, and converted into *Pus*, Digestives or suppurating Medicaments are to be made use of, which in softer Bodies ought to be more mild and gentle (such as are those that are provided of the Oyl of Roses, and the Yelks of Eggs;) and in those bodies that are not so soft, but harder to be wrought upon, they are made of Turpentine, the Oyl of Egs, the Oyl of Roses, the Oyl of Mastick, the Yelks of Eggs; in Bodies that are more dry they are made of Rosin Turpentine, or Rosin of the Fir Tree, the Powder of Frankincense, the powder of Linseed, Wheat flour, Fenugreek, and Hens fat.

After this Cleansers are to be made use of. Yet notwithstanding it often so happeneth, that with one Medicament we satisfie two ends and Scopes, to wit, both concoct and Cleanse. Whereupon it is, that then in this case suppurating Medicaments are to be mingled with Detersives or Cleansers; and so the Suppuratives are made more hot, and more dry then otherwise they are wont to be. Yet nevertheless, in this commixture, there is a regard to be had unto the times; since that in the beginning Suppuratives, in the end Detersives ought to prevail. And indeed it is more safe (forthwith in the very beginning) to mingle Abstersives with Suppuratives, then to use Suppuratives alone by themselves. For Nature is never idle, but even in the beginning betaketh her self unto the generating of Flesh; and to this end she separateth the excrements, which are therefore to be wiped away: neither must we be easily perswaded to make use only of Suppuratives; since that it may then happen that by the use of them the Ulcer may be rendred more moist and fordid: which haply might be the Cause, why *Galen* in the Cure of Ulcers maketh no mention at al of Suppurating Medicaments. And therefore most commodiously unto these Suppuratives, or Digestives (as they are usually called) there are presently added, Frankincense, Rosin Turpentine, and Rosin of the Fir Tree, Oyl of Mastick, the Juyce of Smallage, and the like.

But now such like Medicaments as these may be made in a various and different manner, according to the various Constitution of several Bodies. In a Body that is soft and moist let such a one as this following be made.

Take *Oyl of Roses one ounce, Turpentine two ounces, the Yelk of one Egg, and so mingle them, &c.* That following is yet more dry.

Take *Oyl of Mastick, and of Turpentine, of each half an ounce; the Yelk of one Egg, and so mingle them, &c.* This following is yet stronger.

Take *Rosin of the Fir Tree one ounce, Oyl of Roses six drams, the Powder of Frankincense, one dram; mingle &c.* If there be need of more abstersion, then,

Take *Honey of Roses one ounce, Turpentine, half an ounce, the Juyce of Smallage one ounce, the Powder of Frankincense, and Barley flour, as much as wil suffice, mingle &c.*

The Ulcer being once cleansed, Sarcoticks (that is to say, Medicaments that breed Flesh) are to be made use of; touching the faculty of which we have already spoken, in the

the fifth Book of our Institutions, Part 1. Sect. 1. Chap. 9. Now these are of a threefold rank and order. In the first rank there is the Meal or Flour of Barly, of Fenugreek, and of Beans, Frankincense, Manna of Frankincense. In the second rank there are Rosin Turpentine, Rosin of the Fir Tree, and of the Larch Tree, Honey clean scummed, Honey of Roses, Aloes, the Meal of Lupines, of the bitter Vetch Orobus, *Pompholyx*, or the soil of Brass. In the third rank and order there are, the Meal of the Vetch *Ervum*, raw Honey, the Roots of Aristolochy, of Flower-deluce, Myrrh, Antimony, *Chalcitis* or red Vitriol.

Among the Compound there are these, *Viz. Unguentum Basilicum* the greater & the less of *Galen*, *Unguentum Aureum*, *de Tutia*, *de Matrisylva*. Touching the Emplaster that is made of *Hydrelæon* (Oyl and Water) and the Spume or Froth of Silver, see *Galen* in his first Book of the Composit. of Medicam. according to the kinds, Chap. 6. Or,

Take *Myrrh*, *Aloes*, *of each half an ounce*; *Frankincense one ounce*, *Mastick half an ounce*, *Gum Elemi two drams*, *Turpentine one ounce*, *Colophony half an ounce*; *Make an Unguent according to Art.*

And therefore out of these the Physitian may make his choice of such Medicaments as are most fit and convenient for every several and particular Constitution. For the body by how much the more moist it is, by so much doth it require Medicaments that are less drying and Abstersive: and on the Contrary, the Body when it is more dry, it then requireth the stronger sort of drying Medicaments.

And so likewise in the colder times and seasons of the yeer, we are to use those Medicaments that are somwhat Warmer; but in the hotter seasons of the year, the Medicaments that we make use of may be less hot. For if we apply Medicaments that are weaker then is fitting, then there will be great store of *Sanies* (the thinner sort of Corruption) gathered together in the Ulcer, and the Flesh that is generated wil be soft and flaggy. But if they be overstrong and overdrying, the Ulcer wil then be rendred dry, and the Lips thereof will become very red, the flesh will be consumed and sometimes the Excrements of the Ulcer will be bloody, and a certain kind of mordication or biting wil be perceived in the part. But if the part be rendered exulcerated and dry (as naturally it is wont to be) and that neither *Sanies* nor *Pus* flow forth of the Ulcer, and that there appear a good colour in the Flesh, it is then a Sign of a fit and convenient Sarcotick Medicament.

And here likewise the very form of the Mediment it self ought to be regarded. For they are wont to be applied either liquid or humid, or Dry. In bodies hard and dry, and when a harder flesh is to be generated the Sarcotick Pouders that are to be sprinkled upon the Ulcer are most fit. As,

Take *Frankincense halfe an ounce*, *Dragons Blood*, *Colophony*, *of each two Drams*, *and make a Pouder.* Or,

Take *Frankincense half an ounce*, *Aloes two drams*, *Dragons Blood*, *and Sarcocol*, *of each one dram*; *make a Pouder.*

But if the Bodies be softer, we use those Medicaments that are moist. And yet nevertheless, touching the preparation of Liniments and Unguents, it is to be observed that they be not too soft. For such as these are melted by the heat of the part, and so easily flow about and spread all abroad. And therefore if the Ulcers be not very deep (for in such those Medicaments are required that can penetrate even unto it) but that they stick in the Superficies of the Body, we must then make use of those Medicaments that are endued with a thicker Consistence. Moreover, Unguents that are overmoist, by reason of their Oyly Nature do mollefie, and generate a flesh that is too loose, and unlike unto that lying under it, especially in dry Bodies.

When the ulcer shal be filled up with flesh, it is to be closed with a Cicatrice, a Skin, or in stead thereof a Cicatrice is to be generated, and by the benefit thereof the Continuity that was dissolved is again to be united. But as in the generating of flesh it is Nature that doth the work, and the Blood that supplieth the matter; so likewise the very same happeneth in the generating of the Skin: the Physitian by the Medicaments only removeth the Impediments. But that which is commonly told us, that the matter out of which the Cicatrice is generated is flesh, which by the assistance of the Medicaments is so to be altered, and by the use of Dryers and Astringents is so to be condensed, that it may become like unto the Skin (if it be understood of the principal Agent) is altogether false. For as the Sarcopoietick (or flesh-causing) faculty in the flesh doth only generate flesh, and restoreth that which is lost; even so the Cutifick faculty (as I may so cal it) or Skin-making power, in the Skin doth only generate Skin. Whence it is, that never yet by the use of any Epulotick Medicament, or only by the use of Sarcoticks, hath there been known any Cicatrice to be produced in the midst of an ulcer; but it beginneth to arise alwaies from the Skin lying neer unto it, about the lips of the ulcer, and so by degrees is sensibly extended, until that at length the flesh become wholly covered over with the Cicatrice. And hence it is also that oftentimes the ulcers are brought unto a Cicatrice, without any use at al of Epuloticks. And yet we acknowledge that Nature by the use of the said Epuloticks may be much furthered and holpen in her operation. For if this Action be left wholly unto Nature, the Cicatrice will be generated but very slowly; not (as *Fallopius* thinketh) becaufe that the flesh out of which the Cicatrice

is to be generated is so moist that it cannot be dried by the Nature of the cutaneous or skinny part; but it is becaufe the Cutifick faculty in the Skin that is neer unto it cannot (but very flowly) change and convert into Skin, (which to wit, is a dry fubftance) that blood that floweth in unto it, the faid blood being moift: which it wil more eafily perform, if it be affifted by Epulotick Medicaments that have in them a drying power. But of what quality thefe Epulotick Medicaments are, and what kind of Faculties they have in them, *Galen* teacheth us in his third Book of the Method of Phyfick, Chap. 4. &5. and in his fourth Book of the Compofition of Medicaments according to the kinds of them, Chap. 1. And we have likewife already fpoken touching this very thing, in the fifth Book of our Inftitutions, Part 1. Sect. 1. Chap. 9. To wit, by how much the Skin is more dry than the flefh; by fo much likewife ought the Epulotick Medicaments to be dryer than the Sarcotick. But in thofe that are Active the Medicaments may be as wel hot as cold; or both of them, if there be occafion.

But now thefe Epuloticks are likewife of three forts, to wit, Mild, Mean, and more ftrong. The Milder kind are, Cadmia waſhed, the Rind of Frankincenfe, Aloes, the Roots of fweet Cypereſs (which fome term Engliſh Galangal) Lead burnt and waſhed. The Compounds thefe; Unguent of Litharge, of Minium (or Vermilion) of Ceruſs or white Lead, of Diapompholyx, and he Cerote of Vermilion. The mean and middle fort of Medicaments are thefe; Flowers of red Rofes, Pomegranate Flowers, unripe Gals, the Rind of the Pomegranate Tree, Bole-Armenick, Terra Lemnia or Sealed Earth of Lemnos, Myrobalans, Dragons blood, Vermilion, Lead. Of the Compounds; Unguent of Tutia, Unguent Diapompholyx, Emplaſtrum Diapalma, Emplaſtrum Gryſeum, and the Emplaſter of Lapis Calaminaris. The ſtrongeſt ſort are; Chalcitis, Sarcocol, Allum, Braſs burnt, the off-ſcouring of Braſs. Of the ſtronger Compounds are theſe; Unguent of Tutty, and the Cerote of Bole-Armenick. But now in the choyce of them we are to conſider both the Conſtitution of the ulcer, and the Nature of the body. For it ſomtimes happeneth that the ulcers which when they were ſordid and foul felt no mordacity or ſharp biting (as it were) from the Medicaments, do yet perceive and feel the ſame from them, after ſuch time as they are purged and made clean. Wherefore even then when the ulcer is at the pureſt, we muſt from the ſtronger ſort of Abſterſive Medicaments have recourſe unto thoſe that are more mild and moderate; like as again in ſordid ulcers we are to betake our ſelves unto ſuch as are more abſterſive; unleſs the ulcers were made ſordid by the ſaid mordication. For now and then this very thing lieth upon the Phyſitian, as a thing altogether neceſſary to be done, to wit, that he betake himſelf unto the moſt ſtrong and forcible Abſterſive; upon which the ulcer again appeareth corroded and ſordid, the fleſh that is diſſolved and (as it were) melted by the Medicament, defiling and fouling the ſame; for the colliquated or diſſolved fleſh degenerateth into a filthy and noyſom *Sanies*. And there it behoveth us carefully and diligently to conſider, whether or no the ulcer (the fleſh lying under it being eaten through and diſſolved) be not become ſordid and foul, becauſe that when it required a Medicament apt and fit to take away its filth and naſtineſs, there was yet neverthelefs no ſuch Medicament applied and laid on. But now, when the ulcer is rendered more ſordid and filthy by the acrimony of the Medicament, this is evidently manifeſted by the Cavity that is made in the ulcer, which wil be the greater; as likewiſe the orifice thereof wil be the more red and hot. And then again in the next place, we ought carefully to conſider, whether the conſtitution of the body be ſoft and moiſt, or elſe dry: for unto the ſoft the more mild, but unto the dryer bodies the more ſtrong and prevalent Medicaments are to be applied.

But the Epuloticks are then to be made uſe of (as *Galen* inſtructeth us, in his thirteenth Book of the Method of Phyſick, and Chap. 5.) when the ulcer is not altogether filled up with fleſh, but that there is yet a little thereof wanting. For in regard that Nature is never idle, but that even likewiſe then when it beginneth to produce the Cicatrice, the fleſh likewiſe withal at the ſame time receiveth yet ſome further increment and growth; if then at the laſt Epuloticks ſhould be adminiſtred when the ulcer is already altogether filled up with fleſh, we might wel fear, leſt that before ever the Cicatrice ſhould be compleated and fully finiſhed, in the interim the fleſh ſhould receive yet a further growth and encreaſe, and ſo the Cicatrice ſhould thereby be raiſed the higher. For in regard that the Skin is a Nervous ſubſtance, it cannot therefore be ſo generated anew as the fleſh, but in place and ſtead thereof there is ſomthing generated that is like unto the skin, and this we cal a Cicatrice.

This is likewiſe to be taken notice of, That Epulotick Medicaments ought to be endued (both actually and potentially) with a drying faculty; and that therefore (for the producing and cauſing the Cicatrice) Emplaſters are moſt fitly and commodiouſly adminiſtred and applied.

Gabriel Fallopius in his Book of Ulcers, Chap. 13. propoundeth this Unguent, which he termeth *de Tutia Magiſtrale*; and he there writeth, that of al that he had ever ſeen this is abſolutely the beſt. Viz.

Take *Oyl of Roſes, and Oyl Omphacine, of each ſix ounces; Oyl of Myrtle, and the Unguent Populeon, of each three ounces; Plantane Leaves, and Garden Nightſhade, of each two handfuls. Let the Herbs be cut very ſmal, and*

let

let them be mingled altogether for the ſpace of eight daies, ſhaking and ſtirring them wel together every of thoſe daies. Then ſtrain them, and to the ſtraining add, of Wax four ounces; mingle it with the reſt upon the fire, until that they be al melted: after this mingle them better with a Wooden Spatter, and while it is yet blood-warm, add of the Litharge of Gold or Silver ſix ounces; Ceruß two ounces, Tutty prepared two drams, burnt Lead ſix drams, Braſs burnt unto a redneſs three drams, Camphire one dram and half: ſtir them wel about in a Mortar, by the ſpace of two hours.

An Epulotick Pouder.

Take *the Roots of Tormentil, Biſtort, Round Ariſtolochy, Acorn Cups, Egg-ſhels burnt, Frankincenſe, Dragons blood, of each half an ounce; Lapis Calaminaris one dram, Litharge two drams, and make a Pouder.*

This following Emplaſter is likewiſe very uſeful; the which I have oftentimes made trial of, and that with very good ſucceſs. Viz.

Take *of the Unguent Diapompholyx, the Emplaſter Diapalma, and the Emplaſtrum Gryſeum, of each one ounce; Gum Elemi two drams, Sugar of Saturn one ſcruple, Wax as much as wil ſuffice, and make an Emplaſter.*

Chap. 3. *Of an Ulcer with a Diſtemper.*

BUt it many times ſo happeneth, that the ulcer is not ſolitary and alone, and pure, but that other preternatural Affects are conjoyned therewith; whereupon alſo the Cure is varied. And therefore we intend in the next place to treat of theſe ulcers in ſpecial.

An ulcer with a Diſtemper.

And firſt of al, there is indeed oftentimes a diſtemper conjoyned with an ulcer; which when it happeneth the Cure of the ulcer is then much hindered. For in regard that the Nature of the part is the Efficient cauſe of the Cure of the ulcer, and that the blood is the matter: if the part be intemperate, neither of theſe can be in that right temper that they ought to be, neither can the ulcer be filled up with fleſh, nor cloſed with a Cicatrice, unleſs the fleſh lying underneath it be in its natural temper; as *Galen* tels us in his third Book of the Method of Phyſick, Chap. 8.

But what the differences of the Diſtempers are, we have already acquainted you in the ſecond Book of our Inſtitutions, Part 1. Chap. 3. which here alſo have their place; and there may concur together with the ulcer a diſtemper that is hot, or cold, moiſt, or dry; a diſtemper hot and moiſt; hot and dry; or cold and moiſt, cold and dry: and indeed the diſtemper may be either with or without matter. But of the diſtemper with matter we ſhal ſpeak in the following Chapters. Here therefore in this Chapter we ſhal treat only of a Diſtemper without matter.

The Cauſes.

Now ſuch a Diſtemper as this, either it was preſent before the riſe and appearance of the ulcer; or elſe it was excited even in the very time of the ulceration. But for the Cauſes of theſe Diſtempers, what they are, we have likewiſe told you in the place before alleadged. Which that we may apply unto ulcers, a hot diſtemper in ulcers is excited by a hot Air, by too many Swathbands and bindings, and by Medicaments that are over hot. And on the contrary, a cold diſtemper is cauſed by the cold Air, from the not ſufficiently fencing and guarding the ulcer with Swathbands and warm Rowlers againſt the coldneſs and injuries of the external Air; as likewiſe it is excited by cold Medicaments. The moiſt diſtemper is produced by the moiſt Ambient Air (and hence it is that in ſome places the Air is greatly hurtful unto ulcers) and by the afflux of humors; touching which more in the Chapter following. A dry diſtemper is cauſed by a dry Air, by Medicaments that are over drying, and by the want or ſcarcity of Aliment. Of Compound Diſtempers the Cauſes are likewiſe compound.

Signs Diagnoſtick.

The ſigns of a hot Diſtemper are, that heating Cauſes went before; and alſo, that not only the Lips, but even the very fleſh it ſelf of the ulcer appeareth more red than uſual; and the ſick perſon himſelf perceiveth a great heat in the ulcer, which for the moſt part a pain followeth: Cold Medicaments being thereunto applied do exceedingly refreſh and delight, and withal do greatly benefit the Patient; and on the contrary hot Medicaments are greatly hurtful; the excrements of the ulcer are ſharp and biting.

A cold diſtemper cooling Cauſes went before it; in it the Lips of the ulcer decline unto a whiteneſs, or unto a wan leaden color, and they are ſoft; and hot things are helpful and agreeable unto the ulcer, but cold Medicaments are on the contrary very hurtful. If the Diſtemper be moiſt then moiſtening Cauſes had their precedence, the fleſh is ſoft, and appeareth lank and flaggy, and ſomtimes it groweth forth overmuch; the excrements of the ulcer are many; ſuch things as are drying do benefit, and thoſe Medicaments that moiſten do greatly hurt.

And laſtly, A dry diſtemper is known by this, That drying Cauſes went before, the Lips of the ulcer appear dry, and ſquallid, and hard; the excrements of the ulcer are but few, or none at al. Moiſteners are profitable; but drying Medicaments cauſe much hurt unto the ſick perſon.

Prognosticks.

1. Whereas (as *Galen* tels us in his fourth Book of the Method of Physick, Chap. 1.) for the healing and curing of ulcers the flesh that lieth underneath them ought to be altogether temperate, therefore it is that these ulcers become hardly curable by reason of the distemper in the part lying next under it.

2. Ulcers with a distemper either hot, or cold, or moist, are cured without any great difficulty. For with one and the same pains, and at the same time, and with the very same Medicaments we may both remove the distemper, and cure the ulcer.

3. But those ulcers that are attended with a dry distemper, are the hardest of al to be cured; because that the cure of the ulcer being for a while neglected and laid aside, it behoveth the Physitian to be altogether intent and busied in the removal of the distemper.

The Cure.

A Distemper sheweth that the alteration ought to be by the contraries. Yet nevertheless the Cure ought so to be ordained, that the ulcer (as far forth as may be) may not be neglected. If yet nevertheless we cannot be helpful unto both of them at once, and together, then in this case it behoveth us to be most intent about that that is most urgent. But since that the distemper hath in it the nature of a cause, and that it being present the ulcer cannot be cured; the distemper is therefore first of al to be removed, unless it be so that with one labor and pains both the distemper may be removed, and the ulcer cured. If the distemper be with matter, there wil then likewise be need of universals; of which we shal speak further in the following Chapter.

The Cure of a hot distemper.

But as for the distemper that is without any matter at al (of which we treat here in this Chapter) and withal hot, this hot distemper indicateth and pointeth at cooling Remedies, which ought to be milder, or stronger, according unto the excess of the heat. And albeit the ulcer requireth drying Medicaments, yet nevertheless in regard that the very heat it self by consuming the humors doth render the ulcer more dry, we must therefore make use of the milder and gentler sort of dryers: but yet notwithstanding these ought withal to be such as are likewise endued with an astringent power; that so the flux (which the heat is wont easily to excite) may be inhibited and restrained. Moreover, since that the heat is wont to produce pain, let the Medicaments therefore be such as have in them a power withal of mitigating pain, or at least such as are altogether free from any such faculty of exciting pain; and therefore let them be such as want the drying and abstersive power. Wherefore those Medicaments are useful and proper that are made of the Juyce and Water of Roses, of Plantane, Endive, Vinegar, Saunders, Bole-armenick, Nightshade, burnt Lead, Cadmia, Sugar of Saturn, Oyl of Roses, Turpentine, Plantane Water often washed. Or else let there be administred, the Unguent of Roses, the cooling Unguent of *Galen*, the Unguent of Cerus, of Nightshade, the Santaline Unguent, and the white Unguent. As for instance:

Take *Oyl of Roses, Turpentine, Rose water, or Plantane water often washed, of each one ounce, Barly meal as much as wil suffice; and make a Liniment.* Or,

Take *Lead burnt, and Pompholyx (both of them washed) of each one dram and half, Oyl of Roses, and Violets, of each one ounce and half, Wax a sufficient quantity; make herewith an Unguent.*

The Cooling Medicaments may not only be imposed upon the very Ulcer it self, but likewise upon the parts that lie nigh unto it, and round about it. And therefore we may not only anoynt those parts with the aforesaid Unguents, but we may likewise impose the said Unguents upon them with a Swath-band that hath been first wet in the Juyce of Plantane, Lettice, or Nightshade, or the Decoction made of Myrtles, of Pomegranate rindes, Pomegranate flowers, Saunders, Plantane, Bolearmenick, and the like, adding unto the Decoction a sufficient quantity of sharp and sowr Wine.

The hot Distemper being removed, the Ulcer (as it is wont to be done) is to be cured with Sarcoticks: which yet notwithstanding ought to be less hot and dry, lest that the hot distemper be called back again.

The Cure of a cold distemper.

The Cold Distemper of the Ulcer requireth heating Remedies; such as are the Oyl of *St.* Johns wort, Oyl of Spiknard, of the Flowerdeluce, of Camomile, of Rue, of Dill, the Sirup and Honey of Roses, Rosin of the Fir Tree, of the Larch Tree, the Spirit of Wine, the Cerote of Betony. And indeed Liniments and Unguents made out of these are imposed upon the Ulcer it self. But externally, and upon the neer adjoyning parts there are to be imposed Fomentations, made and prepared (together with a strong and generous Wine) of the Decoction of Sage, Hyssop, Wormwood, Organy, Rue, Mints, Bay Leaves, and Camomile flowers; or else let the said parts be anoynted al over with those hot Remedies even now mentioned; or else let the Cerote of Betony be laid thereon.

The Cure of a dry Distemper.

A dry Distemper requireth moysteners. And here water a little warm is of good use, if with it the Ulcer, or rather the parts neer unto the ulcer, be besprinkled or fomented. For albeit *Hippocrates* in his Book of ulcers teacheth us,

us, that we ought not to moisten universal ulcers, unless it be with Wine; and further addeth, that what is dry cometh neer unto that that is sound, and that that is moist cometh not nigh unto it; and although *Galen* in his third Book of the Method of Physick, and Chap. 4. and in his first Book of the Composit. of Medicaments according to the kinds, and Chap. 6. writeth, that no moistening Medicament is fit and convenient in the Cure of ulcers, and least of all Water: yet nevertheless, these things are altogether to be understood of an ulcer, as an ulcer; for the which Moisteners are no waies useful and proper. But if there be conjoyned with the ulcer a dry Distemper that hindereth the Cure thereof, then (the Cure of the ulcer being as it were left for a while) we ought to apply Remedies unto the dry Distemper, until such time that we find that the part affected hath recovered its pristine due temper.

The Cure of a moist Distemper.

And lastly, a Moist Distemper sheweth us that drying Remedies must be made use of. And because that an ulcer doth otherwise require drying Medicaments, therefore the Sarcoticks that we here make use of ought to be stronger than in a simple ulcer: and such are, the Roots of sweet *Cyperus* (or English Galangal) Horehound, the Spume or froth of Silver, burnt Lead, Chalcitis, the drosse scales of Iron and Brass, and such like; out of which Medicaments are to be provided fitting and proportionable unto the greatness of the distemper of every ulcer. For by how much the moister the ulcer is, by so much the more forcibly and strongly drying ought the Remedies (that are required) to be. And on the Contrary, if the ulcer be but little or nothing moist, then the Remedies that we administer ought to be more mildly and gently drying; which is done by adding unto the stronger sort of them, Oyl, Rosin, and Wax. For by how much the more there is of these added unto the former drying Medicaments, by so much the more is their drying faculty and power abated and weakned; and by how much the less, by so much the more strong and entire doth their drying faculty remain. The ulcer may first of all be washed (for the cleansing away the filth and nastiness thereof) with Wine, or *Posca*, in which Astringents and Dryers (such as are sweet Cyperus Root, St. Johns wort, Wormwood, Roses, Betony, and Sage) have been boyled: after this some of the aforesaid Medicaments may be strewed thereon; or else an unguent may be made thereof with Oyl and Wax, that without any warming at all may be extended and spread upon the Liniment (the Greeks call it *Emmoton*) and at last upon this we may likewise impose and lay on some hard Plaister, or Cerote. These Compounds and Emplasters are by *Galen* recounted in his first Book of the Composit. of Medicaments, and Chap. 13. Now as for the manner and measure of this humectation or moistening, let it be until the part begin to be lifted up, and to appear very red, and no longer; for we must then desist from any further washing and besprinkling it. For if we continue thus doing any longer, then that that hath been attracted wil be dissipated. Now as for the manner how this warm Water is to be applied unto the part, it is threefold; and it is performed either by fomentation, or pouring it on, or by bathing therein. The Fomentation is performed with a Spunge, a Cloth, Hurds, or Cotton: and this Fomentation is the most commodious and convenient way of moistening the part affected. As for pouring the warm Water thereon, or bathing in it, we conceive not that it is any way so fit and proper. And it wil be yet far better, if the part be fomented with Oyl and Water together blood-warm, rather then with Water alone, especially in the Winter time. For although warm Water may heat the part with an actual warmth; yet nevertheless, after the fomentation is past, it cooleth the part, and withal scattereth the heat; which is prevented by mingling Oyl therewith, for by this means the Pores of the Skin are obstructed. After the fomentation, let some Cataplasm that hath in it a Moistening faculty be laid on. As for example.

Take *the Leaves of Mallows boyled to a softness, half an ounce; Barley meal, and Wheat flour, of each two drams; sweet Almonds bruised one dram and half; Honey boyled one dram, Saffron half a scruple, Swines fat as much as will suffice, Mingle them wel together in a Mortar, and make a Cataplasm.*

Or else let the laid part be fomented with Oyl. Or else let an Unguent be made for it, of the Juyce of Mallows one part, sweet Oyl two parts, white Wax as much as wil suffice.

But if the Ulcer be dry, and the part lie under an Atrophy, so that the pouring of Water upon it wil not suffice, we must then (in the first place) do our endeavor in taking care that the sick Person may be nourished with meats that afford much good Juice, and which are easily distributed; that so there may be abundance of aliment administred unto the part affected; and moreover, if need require, it may be drawn unto the part, by the use likewise of those Oyntments we cal *Dropaces*, or by any other wáies and means.

The Distemper being removed, we are then to make use of Sarcoticks (and these indeed must be such as dry but little), lest that otherwise the part affected should again relapse into its dry Distemper, as *Galen* wel cautioneth us, in the fourth Book of his Meth. of Physick, and Chap. 1. and therefore together with these Sarcotick Powders there ought to be added certain Fats and Oyls, and Wax. As,

Take *Frankincense, and Mastick, of each one dram; Turpentine one ounce, Oyl of Roses one*

ounce and half, Wax as much as will suffice, and make a soft Unguent.

Chap. 4. *Of an Ulcer with the afflux of humors.*

But very rare it is, that a Distemper happeneth alone unto an Ulcer; but for the most part, the Distemper is accompanied with matter, and the afflux of humors.

But now how many Causes there are of the afflux of humors, we have already told you, in the first Part, Chap. 1. touching Tumors in general. To wit, unto the exulcerated part there flow humors, either from the whole body, or else from some one particular part generating vitious humors; whilest Nature instigated and stird on either by the abundant store, or by the quality of the humor, expelleth and driveth them forth, and heapeth them up in the exulcerated part; or else when the part (by reason of pain, or heat) attracteth the humors; or when the humors do of their own accord flow down unto the part that is situated in a lower place; or else when they are any otherwise moved unto a weak and ignoble part: all which in what manner and by what means they may happen, we have acquainted you in the place before alleadged.

There is great variety of Excrements that cometh from the afflux of the Humors unto the exulcerated part. *Galen* in his Book of the times of the whol Disease, divideth these Excrements into *Sanies* and *Pus*. *Celsus* likewise in his fifth Book, and Chap. 26. besides the blood that is known unto al, determineth that likewise *Sanies* and *Pus* do issue forth from wounds and ulcers; and there he thus writeth: That *Sanies is thinner than Blood, and yet variously thick also, and glutinous, and colored.* Pus *is most thick, and most white, more glutinous than Blood and Sanies. There issueth forth blood* (saith he) *from a wound that is recent and new made, or else that hath been of some continuance, and is now upon its healing.* The Sanies *is betwixt both these times.* Pus *out of an Ulcer that is now upon the very point of healing. Again, both* Sanies *and* Pus *have certain species or kinds distinguished by their Greek names. For there is a certain kind of* Sanies, *which is termed either* Ichor, *or* Meliceria. *And there is a* Pus *that is called* Elaiodes. Ichor *is thin, somthing white, and it issueth forth of a bad and naughty Ulcer, and especially when a Nerve being hurt, an Inflammation followeth thereupon.* Meliceria *is thicker and more glutinous, somwhat whitish, and not much unlike unto white Honey: This likewise issueth out of evil Ulcers, when the Nerves neer about the Joynts are hurt; and of al these places it especially floweth forth of the Knees.* Elaiodes *(which is thin, somwhat white, as it were anointed with a kind of fatneß, and not much unlike unto white Oyl) appeareth in great Ulcers, that are upon the point of healing.* Yet notwithstanding others there are that do otherwise use these names. Yet nevertheless, if we wil speak properly, *Pus*, with the Greeks *Puon*, is that excrement of the ulcer that hath its original from Blood, or from the flesh bruised and dissolved, and it appeareth in ulcers that are void of al other excrements, or such as have been just now cleansed from other excrements. Al the rest of the excrements that proceed from other humors, although they may be comprehended under the name of *Ichor* or *Sanies*; yet nevertheless the most do distinguish between *Sanies* and *Sordes*, and they cal the thin and watery excrements by the name of *Sanies* (which some do cal *Virus* or Venom) but the thicker excrements they cal *Sordes*; so that from the thin excrement the ulcer is rendered moist, and from the thick it is made sordid and foul.

Signs Diagnostick.

Ulcers with the afflux of humors are known, First, by the Tumor or Swelling that appeareth not only in the lips, but likewise in the neer adjoyning parts. And then (next of all) from the pain, which is very grievous and troublesome unto the sick Person, especially if the Nervous parts be affected. Thirdly, from the great store of excrements, which is far greater than what it was wont to be, proportionably according to the magnitude or bigness of the Ulcer. And lastly, albeit there be likewise adminiſtred all things that are necessarily required unto the Cure thereof, yet we find the Cure of them very difficult; in regard that the flowing humors hinder the Cure.

Prognosticks.

1. All Ulcers (as we said but now) with an afflux of the humors are very hard to cure; in regard that from the afflux of the humors the Ulcer is rendered moist, gains growth and increase thereby, swelleth up, and the pain is likewise hereby xci ted.

2. But by how much the afflux of the humor is the greater, and by how much also the humor that floweth thereto is the worse, by so much the more difficult will it be to Cure the Ulcer.

The Cure.

First of all therefore, in regard that the Ulcer cannot be cured unless the Flux be removed, therefore the Flux it self, with all its Causes, is to be taken away; and thereupon, whether in the whole body, or else by the default and something far amiss in the Liver, or the Spleen, the vitious humor be generated, the generating of it is to be hindered and prevented, and so much thereof as is already flown in is in a convenient manner to be prepared

prepared and evacuated; touching which very thing we have already elſwhere ſpoken at large. Moreover, leſt that the humor ſhould flow unto the affected part, it is to be drawn back, intercepted, and driven back. Among the Revulſive Aids and Remedies, in the firſt place we eſteem and account of Iſſues that are made in the contrary part; becauſe that the Humor that floweth unto the part affected, they evacuate and empty it forth by ſome other place. And theſe Iſſues are indeed oftentimes very neceſſary in old inveterate Ulcers. For when Nature hath been now of a long time accuſtomed to evacuate the vitious humors by the exulcerated part, if the ulcer be altogether cloſed, and that there be any of the vitious humors heaped up there, it may eaſily then come to paſs that theſe humors regurgitate and flow back again into the Veins, and ſo ruſh into ſome more noble part; but al this may be prevented by a Fonticle or Iſſue.

But the aforeſaid Defenſives do intercept; which are to be impoſed above the exulcerated part, in the ſound part, toward the root of the Veſſels, in thoſe places where the Veins being bigger do appear more conſpicuouſly; which ſaid Veſſels (through which the humor floweth) they ſtrengthen and ſhut up, and withal drive back the humor. And they are formed out of thoſe Medicaments that are dry and aſtringent; ſuch as are, Bole-armenick, Dragons blood, Flowers of Red Roſes, Pomegranate flowers, the Rinds of Pomegranates, Myrtle, Allum with the white of an Egg, Oyl of Myrtle, Oyl of Roſes, auſtere or ſharp Wine, aſtringent Waters: Out of which Cataplaſms or other Medicaments are prepared.

But then unto the part affected it ſelf Repellers are to be applied, that ſo the Humors that do as yet fluctuate in the Veſſels of the affected part may be repelled. And therefore the exulcerated part, or the parts neer unto it, are to be waſhed with Allum Water, the Water or Decoction of Plantane, of Roſes, of Pomegranate flowers, the Roots of ſweet Cyperus, Cinquefoyl, and the like: but the neer adjacent parts are to be anointed with the unguent of Bole. And in the middle of the Ulcer there is a drying Pouder to be laid on, of Litharge, Tutty, Lead, Corals, Bole-armenick, Chalcitis, the white unguent of *Rhaſis*, and unguent Diapompholyx. In a word, the Sarcoticks ought here to be ſtronger than in the ſimple ulcer that is not peſtered with this flux, that ſo they may throughly dry up the humor that ſticketh in the pores of the parts; and yet nevertheleſs they muſt be ſuch as are without any mordacity at al, that ſo there may be no pain excited. As,

Take *Turpentine one ounce, the Suet of a Bull half an ounce, burnt Lead an ounce, Tutty prepared half an ounce: Mingle them, &c.*

But yet nevertheleſs, if the matter be crude and biting, ſome Frankincenſe is to be added, to further the Concoction of the humor.

Touching the form of the Medicaments this is to be obſerved, that they be not of a moiſt conſiſtence, not Oyly and fat, in regard that they do more looſen and moiſten the part, as *Galen* tels us in his firſt Book of the Compoſition of Medicaments, Chap. 6. and in his fourth Book of the Compoſition of Medicaments, Chap. 1. & 13. And yet nevertheleſs, we are not alwaies to perſiſt in one and the ſame kind of Medicaments. For it oftentimes ſo happeneth that what did once or twice do good, may afterwards (the humor being any waies dried up) prove prejudicial and hurtful, by exciting a mordication or biting; and there the Medicament is then to be changed, and one more gentle to be adminiſtred in the place thereof.

After that the ulcer is filled up with fleſh, the Cicatrice is at length to be brought over it by Epuloticks.

Guido in his Tract. 4. Doct. 1. Chap. 2. upon ſuch ulcers as theſe, adviſeth us to lay on a thin Leaden Plate with a hole bored through it. For Lead being thus beaten into a thin Plate cooleth, and therefore is of ſpecial uſe in ſuch like ulcers, if a fitting Ligature be added; in regard that it preſſeth forth the humor out of the part affected, and hindereth the influx thereof into the part exulcerated.

Chap. 5. *Of the ſordid, putrid, and corroding Ulcer.*

THe moiſt ulcers that are accompanied with an afflux of Humors are for the moſt part thereby made ſordid and foul (ſuch as the Greeks cal *Rupara*) to wit, if that thick and fnotty excrement (which in ſpecial they cal *Sordes*) flow forth; and putrid, if the ſaid excrement breath forth a grievous and noyſom ſmel, like unto that of a dead Carkaſs. For ſordid and putrid ulcers (as *Guido* in his Tract. 4. Doct. 1. Chap. 3. telleth us) differ only in degrees, viz. in this, That the one is ſuch in a greater, the other in a leſs degree. For if the excrements of the ulcer be ſimply thick and ſordid, then we cal it a ſordid ulcer; but if they likewiſe receive a putridneſs, inſomuch that they putrefie and corrupt the fleſh that lieth under it, and alſo the ſofter parts, ſo that there breath forth from thence a noyſom and unſavory vapor, then it is called a putrid ulcer.

The Cauſes.

The nigheſt Cauſes of this ulcer are depraved humors, malignant, and ſuch as receive an extraneous and moiſt heat and putridneſs. And indeed theſe humors either they flow unto the part affected from ſome other place, or elſe they become ſuch in the very part it ſelf, by reaſon of ſome diſtemper or debility in the ſaid part, or by reaſon

reason of the unseasonable use of moist, and unctuous, and Emplastick Medicaments; or by reason of the administring thereto those Medicaments that were too weak in drying, and omitting those Dryers that were required. And on the contrary, likewise, the same ulcers are made sordid, by reason of overstrong Abstersives, that even melt and dissolve the sound flesh.

And sometimes the humor acquireth so great an acrimony, that it corrodeth not only the exulcerated part, but likewise the sound part lying neer unto it, and from day to day creepeth wider and broader; and these ulcers are termed Corrosive, Creeping, and Devouring Ulcers.

Signs Diagnostick.

Sordid ulcers are easily known by the sight; when there appear in them in great abundance certain Impurities that are viscid and clammy; when the flesh is become flaggy and soft, and oftentimes groweth forth too far. If also there be added a putridness, and if there be perceived a grievous stinking smel, and such as is like unto that of a dead Carkass. If the ulcer be corrosive and creeping, if an itching and pain be felt; and if the ulcer doth continually grow greater.

As for what belongeth unto the signs of the Causes; if the humors flow either from the whol body, or from any one part thereof, this wil appear by those signs that we have already propounded in the precedent Chapter. If the part be weak, and distempered, this may likewise be known by signs of its own; and there wil then be no appearance at al of any fresh and lively color in the part. If the Ulcer hath been made sordid and foul by the weakness of any Medicament, then the ulcer appeareth whitish, and that whiteness encompasseth about the whol ulcer, like unto a kind of Web. On the contrary, if the ulcer hath been made sordid by a too strong abstersive Medicament, then the ulcer is made hollow, and afterward from day to day it becometh more red; and there floweth forth a subtile *Pus* that is not much in quantity, but very hot.

Prognosticks.

1. If by reason of the great store, and the thickness of these *Sordes* or impurities the transpiration be hindered, then there followeth the corruption of the part; and so of a sordid ulcer it afterward becometh a putrid and depascent or devouring ulcer.

2. If putridness be encreased in the ulcer, at the length a Gangrene and a Sphacelus follow.

The Cure.

In sordid and putrid ulcers there is first of al great care to be had in the course of Diet; and the body is to be purged from al bad and vitious humors. But upon them there is to be put Abstersive and cleansing Medicaments; such as are Mulsa, Salt Water, and those things that are made of the juyce of Smallage, of Wormwood, Barley meal, of the bitter Vetch Orobus, Myrrh, and Honey of Roses. But more especially the Spirit of Wine doth exceedingly benefit in the purging and cleansing of al putrid ulcers; which is therefore to be mingled together with the other Medicaments. As,

Take *Lignum Guajacum, and the Rinds of the same, of each one ounce; the Root of long Aristolochy, the lesser Centaury, Wormwood, and Agrimony, of each one handful; the Rind of the Frankincense tree, Myrrh, of each half an ounce: boyl them al in a sufficient quantity of Wine; unto the straining add of Honey scummed four ounces, the Spirit of Wine one ounce: mingle them, &c.* Or,

Take *the Root of long Aristolochy one ounce; Wormwood, Centaury the less, Agrimony, of each half a handful; boyl them in Wine. Unto the straining add the flour of the bitter Vetch Orobus half an ounce; the pouder of Mirrh two drams; Honey of Roses two ounces; Spirit of Wine one ounce; Turpentine as much as wil suffice to make a Liniment.*

If the ulcer be become sordid by the alone use of Unctuous and Oyly Medicaments, and if that there be no other more grievous cause of the foulness and nastiness thereof, then the milder and gentler sort of Abstersive Medicaments may suffice: for the drier sort of Medicaments being administred, the ulcer is easily cleansed.

But if the ulcer be become sordid and foul from the use of Medicaments that were overstrong, then the milder are to be imposed; such as are the unguent Diapompholyx; the stronger sort of them are, unguent Apostolorum, and the Ægyptiack unguent. Or,

Take *the Decoction of Barley one pint; Honey of Roses two ounces, mingle, &c.* Or,

Take *Turpentine and Honey of Roses, of each half an ounce; Meal of Barley, and of the bitter Vetch Orobus, and Mirrh, of each one dram; Pouder of Flowerdeluce root half a dram.* Or,

Take *the Juyce of Smallage, and Wormwood, of each one ounce; of the meal of Barley, of the bitter Vetch Orobus, of each one dram; Turpentine one ounce; Mirrh two drams; Honey one ounce, and mingle them, &c.* Or,

Take *Agrimony, Centaury the less, of each half a handful; boyl them in Wine: unto the straining add the juyce of Smallage two ounces; Honey of Roses one ounce; the meal of Barley, and of the bitter Vetch Orobus, of each one dram and half; Turpentine washed in the Spirit of Wine, two ounces; mingle them: and make a Liniment.*

If the ulcer be putrid, it is to be washed with Oxycrate, Ley, Brine; and upon them there are

to

to be impoſed Medicaments made of the meal of the bitter Vetch Orobus, the root of long Ariſtolochy, Squils boyled in Wine, and mingled with Honey.

But the hollow Ulcer that is ſordid and putrid, is to be anoynted with the Unguent of Bolearmenick, or ſome other Cooler, leſt that there be an afflux of humors excited from the uſe and biting quality of hot Medicaments.

If the putridneſs be greater, ſo that there be cauſe to fear leſt that the part it ſelf may be corrupted, then we are to make uſe of the ſtronger ſort of them, which ſhall be hereafter declared and ſet down in the Chapter of the Gangrene and a *Sphacelus*.

And laſtly, if the Ulcer be Corroſive, and that the ſound parts be likewiſe corroded; then that that is corrupted ought to be taken quite away, either by inciſion, or by Cautery (whether actual or potential, it matters not much) until that at length we come to the ſound fleſh, and that the ſound and quick fleſh be ſeparated from that which is corrupt and dead. But as touching theſe things we ſhal ſpeak further hereafter in that that followeth touching *Phagedæna*, and a *Gangrene*, and *Sphacelus*.

Chap. 6. *Of an Ulcer with Tumors.*

FRom the afflux of humors unto the ulcerated part there is not only a Diſtemper generated, but there oftentimes likewiſe happen Tumors.

The Cauſes.

Now the truth is, that there is no other Cauſe of theſe Tumors then what hath been before expreſſed and explained, *touching an Ulcer with the afflux of humors*, and above in the firſt part of Tumors. But now according to the diverſity of the flowing humors, ſuch is likewiſe the diverſity and variety of the Tumors that are excited, to wit, an *Inflammation*, an *Eryſipelas*, *Oedema*, and *Cancer*. But what humors they are that excite thoſe Tumors hath been above declared, where we ſpake of Tumors.

Signs.

What kind of Tumor this is, and what danger it produceth and threateneth, appeareth likewiſe ſufficiently from the places alleadged; neither is there any need at all that we repeat any thing here of what was there ſaid.

The Cure.

The way, Means, and Method of Curing it was there likewiſe declared; which is yet nevertheleſs here in ſuch manner to be inſtituted, that the Ulcer may not in the leaſt be neglected. If therefore either the Blood offend in its quantity and overgreat abundance, or elſe if vitious humors abound in the body, theſe are firſt of all to be evacuated. In the next place regard is to be had to the very part affected. After this, Medicaments are to be applied unto the place affected, which may either diſcuſs the humor that is the Cauſe of the Tumor, or elſe convert it into *Pus*.

And therefore in an Inflammation there ought to be applied a Cataplaſm made of Quinces boyled with the Pouder of Myrtle, or of boyled Lentiles, with the Meal or flour of Barly, Pomegranate rinds, and red Roſes. In the augmentation of the Ulcer there muſt be added Camomile flowers, and Bean meal. In the State, Mallows, Marſhmallows, the meal of Linſeed, and of Fenugreek. As,

Take *Barley meal two ounces, the pouder of Camomile flowers one ounce, the meal of Linſeed and of Fenugreek, of each ſix drams; and make a Cataplaſm.*

If the Tumor tend toward a Suppuration, the Suppuration is then to be holpen on with a Cataplaſm of Mallows, Maſhmallows, Linſeed, Fenugreek, and Wheat, and other ſuch like Ripeners. As,

Take *Mallows, Marſhmallows, of each one handful; boyl them in Water until they be ſoft, and then bruiſe them well: When they are bruiſed, then add of the flour of Linſeed, and Fenugreek, of each one ounce; Wheat flour half an ounce, Swines fat and Oyl of Roſes, of each one ounce, and Mingle them.*

If an *Eryſipelas* be joyned together therewith, externally, and in the neer adjacent places, thoſe Medicaments are to be impoſed that we have above propounded, in the firſt Part, and Chap. 7. touching an *Eryſipelas*. There is here very uſefully impoſed upon the external parts the water of Elder flowers, and Nightſhade. We add this only, that ſomtimes it ſo happeneth, that (as in an *Eryſipelas*) if it be not rightly Cured, and if ſuch things ſhal be raſhly and unadviſedly adminiſtred that obſtruct the Pores, ſo that the humor can by no means paſs forth, nor be diſſipated, or that there be cauſed an overgreat afflux of humors, Puſtules oftentimes, yea and greater bliſters and bladders are excited in the affected part; out of which when they are broken, there iſſueth forth a watry *Sanies*, and the part is afterward exulcerated; and unleſs it be rightly handled, the Affect ſoon degenerateth into long continuing and malignant Ulcers (eſpecially in the Thighs) yea and oftentimes into a very Gangrene it ſelf. Which if it ſhould chance ſo to happen, it wil then be very requiſite to make uſe of Coolers, Driers, and Aſtringents together. As,

Take *Plantane Leaves one handful, flowers of red Roſes half a handful, boyl them to a ſoftneſs, and then let them be bruiſed; when they are bruiſed and paſſed through a Hair-ſieve, add of*

Barley

Barley meal one ounce and half, the pouder of Pomegranate flowers half an ounce, with the oyl of Roses make a Cataplasm.

That that is here especially useful and profitable is the Unguent *Diapompholyx*; unto which (if you please) you may yet further add some Sugar of Saturn.

If the Tumor be cold, then such a like Cataplasm as this may be imposed.

Take *the Leaves of Mallows, Marshmallows, of each one handful; and boyl them in Ley unto a softness, and then bruise them wel; then add the pouder of Marshmallow root one ounce and half, Camomile flowers ten drams, Oyl of white Lillies as much as wil suffice, and so make a Cataplasm.*

If a *Cancer* be joyned with the Ulcer, there can then be no other Cure more fit and proper then that we have already propounded, touching an ulcerated *Cancer*.

The rest of what might here be spoken touching these may be seen, if they be sought for in the first part, touching Tumors.

Chap. 7. *Of proud flesh growing forth in Ulcers.*

IT happeneth oftentimes, that in Ulcers there is found proud flesh, and such as groweth forth further then what is fitting; which Malady the Greeks term *Hypersarcosis*; which whensoever it happeneth, it hindereth that the Ulcer cannot possibly be shut up with a Cicatrice.

The Causes.

Now this happeneth either from the abundance of blood that floweth unto the part affected; or else by reason that the Sarcotick Medicaments that had been administred were overweak, and less drying then what was fit. If the former of these be the Cause, then the flesh it self wil be in a right temper, only there wil be too much thereof. If overmuch flesh proceed from the latter of the two Causes, then the flesh wil not be sound and solid, but loose and Spungy.

The Cure.

As for what concerneth the Cure, if the first happen, fasting and spareness of Diet is then to be enjoyned unto the sick Person, and dry Medicaments are to be imposed. But if the flesh begin to grow proud by reason of the use of Sarcotick and detersive Medicaments that were in their own Nature overweak, then we ought to make use of the stronger sort of Detersives, and such as produce a Cicatrice; and if there be occasion, even septick Medicaments likewise. And such are, a Spunge burnt, dry Liniments imposed, the rind of Frankincense, Galls, Aloes, Tutty, and burnt Alum.

And indeed in the Toes, when by reason of the compression of the excrescent Nails the flesh beginneth to be luxuriant, so that a man can neither put on his Shoes, nor go without pain, then burnt Alum alone sprinkled thereon wil take away the said flesh. The stronger Medicaments, are, the rust and scouring of Brass, Chalcitis, Mercury precipitate, Mercury sublimate. And therefore whensoever there is need but of litttle drying, then let there be imposed dry Liniments, or else such as have been soaked and wel wet in this following Decoction.

Take *Galls, the rinds of Frankincense, and Mastick, of each one dram; Flowers of red Roses, Pomegranate flowers, and Rue, of each half a handful, Alum two drams; boyl them al in Wine.* Or,

Take *Galls, Pomegranate rinds, a Spunge burnt, of each alike; and make a Pouder to be strewed thereon.*

There is more especially useful this green water following, which being besprinkled upon the luxuriant flesh, or else imposed thereon by Liniments, it taketh away the said flesh without any pain at all, and generateth a Cicatrice.

The Green Water.

Take *Alum Crude, and Green, of each two drams, boyl them in eighteen ounces of Wine, until a fourth part be wasted; then strain it; and then take Camphyre one dram: dissolve it in one ounce of the Spirit of Wine, and add it unto the former.*

The stronger are these:

Take *Plantane water, and Rose water, of each five ounces, Mercury sublimate one dram, let them boyl, and then strain them through a thick Linen Cloth. In the straining let the Liniments (being cut into divers pieces) be laid to soak, or the Linen Cloth; and let it be again throughly dryed, and reserved for use.* Or,

Take *Galls, Pomegranate flowers, of each one dram; Dragons blood, Ceruss, the rust of Brass, of each half a dram; burnt Alum, Frankincense and Myrrh, of each one dram; Make hereof a Pouder.*

Chap. 8. *Of an Ulcer that is wan, and Callous.*

IT sometimes so happeneth that the lips of the Ulcer are made hard, wan, and Callous. Now this is caused by those things that dry overmuch, or by the cooling of the externall Air, or by the afflux of hot humors.

But from what cause soever it happen, the Ulcer cannot be cured, neither can it be closed up with a Cicatrice, unless that hardness be first taken away, and the exulcerated part be reduced unto its natural state. And therefore if the hardness be less, then Emollients and Discussives are to be made use of, such as are of the Mucilage of Linseed,

of

of Fenugreek, Oyl of ſweet Almonds, Oyl of Earth-worms, the fat of a Hen, and the fat of Ducks, &c. As,

Take *the Mucilage of the ſeed of Marſh-mallows, of Fenugreek, of each two drams; Turpentine one ounce; Oyl of ſweet Almonds, and of white Lilies, of each three drams; Wax as much as wil ſuffice, and make a ſoft Unguent.*

The ſimple Diachylon Emplaſter is likewiſe here very good, and of ſingular uſe.

But now if the hardneſs be greater, and that it yield not, neither give way unto Emollient and Diſcuſſive Medicaments, after what manner ſuch a like ulcer ought then to be cured, *Galen* teacheth us, when in the fourth Book of his Method of Phyſick, and Chap. 2. he thus writeth: *When the lips of the Ulcer* (ſaith he) *are only ſomwhat diſcolored, or made a little harder than ordinary, they are then to be cut out even unto the ſound fleſh. But whenas this Affect hath made a further progreſs, then it falleth under deliberation, whether al that which is ſeen to appear preternaturally be to be cut forth, or elſe rather in time, and as ſoon as may be to be cured. And it is without doubt, that in this caſe the wil and mind of the Patient is to be conſulted and followed. For ſome of them had rather be cured without being cut, though it be a long time firſt: Others again there be that wil be content to undergo any pain or hardſhip, ſo that they may be ſoon and ſuddenly cured.* For ſuch like ulcers are moſt ſpeedily (yea and moſt commodiouſly likewiſe, and fitly) cured, if the hard and wan fleſh be cut forth (even unto the ſound) with a fit and convenient Inſtrument. For both the pain is ſhorter, neither is there any bad and hurtful quality introduced into the part, as there is by corroding Medicaments. For the hardneſs thereof is likewiſe very fitly waſted and removed by an actual Cautery.

But if the ſick perſon wil endure neither inciſion, nor burning, the hard fleſh is then to be waſted away, and conſumed by ſuch like corroding Medicaments as we have elſwhere propounded. The green Water that we deſcribed in the foregoing Chapter is likewiſe of ſingular benefit; and ſo is the Pouder alſo there mentioned. The Oyl of Vitriol is one of the ſtronger Remedies.

Yet nevertheleſs, we muſt be very cautious how we uſe the ſtronger ſort of Medicaments in the Nervous parts: and Defenſive Medicaments are to be applied unto the neer parts, leſt that there be a pain excited, and a new afflux of humors cauſed.

If the lips of the ulcer be leaden colored, wan, and black, they are then to be ſcarified, and the vitious blood is to be drawn forth: afterward a dry Spunge is to be laid thereon; and at length drying Medicaments, as the green Water, or the Pouder deſcribed in the precedent Chapter, or the like Medicament.

Chap. 9. *Of Ulcers that are hollowed and furrowed.*

IF *Pus* and *Sanies* be long contained in the Apoſtem, or Impoſtume, and ſhal in its own nature be ſharp, or elſe ſhal become ſuch by its long continuance there, it then maketh (as it were) Conney-burroughs, and formeth a hollow nook, by the Greeks called *Colpas*. But touching theſe nooks and furrows (in regard that we have already ſpoken thereof above, in Part 1. Chap. 6.) it wil be altogether needleſs here to add any thing more unto what hath been there delivered. Only we ſhal yet here acquaint you with ſome few things by way of Advertiſement. The firſt is this, That hollow and furrowed Ulcers may not only be ſo bred, but the ſinuous and nooky ulcers may oftentimes likewiſe ſucceed wounds; which eſpecially happeneth by the negligence of the Chirurgeons, and this very frequently chanceth in the Thighs. For if ſuch like places where the Muſcles are larger the wound be not ſo ordered that the *Pus* may be expelled forth by the orifice of the wound, it then by its weight deſcendeth according to the guidance of the Muſcles, and there raiſeth furrows and Conney-burrows (as the Latine Phyſicians term them) and more eſpecially if it hath been long detained, and be thereby become ſharp and corroding. And in ſuch a like ulcer, ſince that al the *Pus* can hardly be expelled forth by the Ligature that is toward the upper Orifice, it wil therefore be neceſſary to open a *Sinus* or nook in the lower part; which being done, and a way and paſſage made for the iſſuing forth of the *Pus*, ſuch wounds are afterward eaſily cured.

And therfore in the ſecond place it is to be noted, That we are to uſe ſuch an expreſſive Ligature (leſt that, whether in Wounds or in Ulcers Fiſtula's be generated) to wit, which beginneth from the very bottom of the wound or ulcer, and endeth in the orifice thereof; this notwithſtanding alwaies provided, That by how much the neerer it approacheth unto the Orifice, by ſo much the looſer ought it to be.

Thirdly, You are to be hereof admoniſhed, That in regard ſuch like ſinuous ulcers become ſordid and foul, for the moſt part, that therefore the Spirit of Wine is very fitly mingled together with other Medicaments, becauſe it hath in it an excellent property and vertue to cleanſe and purifie ſuch like ulcers as theſe. *Franciſcus Valeriola* hath a ſingular and happy way of Curing this dangerous nooked or furrowed ulcer, in the fifth Book of his Obſervations, Obſerv. 1. and another in the ſame place, Obſerv. 7. where they may both be ſeen. But yet nevertheleſs I hold it

not amiss here to acquaint you with those Medicaments he there maketh use of; for as for Section (or cutting) he would not for many reasons by any means allow of, or appoint it. *First of all* (saith he) *after Universals, and a special regard had unto the whol body, we coming unto the cure of an Ulcer in one that was extreamly afflicted therewith, found (in regard that it was sordid and foul, and hollow, and sinuous) that it wanted cleansing and filling up. But in regard that the Cavity could not be filled up, without first cleansing the Ulcer, therefore the Ulcer was first of al to be cleansed and purified: for an Ulcer can neither be filled up, nor agglutinated, unless it be pure and clean, as* Galen *tels us. And therefore to cleanse away the thin Ichorous excrements and impurities (with which the Ulcer was extreamly pestered) we proceeded in the use of many several Remedies, stil proceeding from the weaker unto the stronger.*

Take *the Decoction of whol Barley one quart; Honey of Roses six ounces; mingle them, and make an injection thereof into the inside of the Ulcer with a straight Syringe or injection pipe; this without any mordacity at al cleanseth and washeth away the filth and pollutions of those thin ichorous excrements of any Ulcer. But when we had discovered that there was present much both thick and sordid* Sanies, *we then found that there was great need of a stronger cleansing. And thereupon we made use of this other stronger and more prevalent Remedy, to wit, mingling therewith the aforesaid* Ægyptiack Unguent, *and withal mingling a smal proportion of* Aqua vitæ, *viz. Two ounces. Somtimes, and after some certain daies when we had made use of this second Decoction, and yet had not sufficiently gained our desire as touching the detersion and cleansing of the Ulcer, we then thought good to make use of this notable and effectual Injection.*

Take *Lignum Sanctum poudered very smal, and the bark of the same Wood, of each two ounces; long Aristolochy, Centaury the less, Wormwood, Agrimony, Horstail, Olive Leaves, Myrtle Leaves, Pimpernel, and the greater consound, of each one handful; the rinds of Frankincense, Myrrh, and Sarcocol, of each half an ounce; sweet scented red Wine three pints; Honey scummed four ounces; let there be a decoction of them al; of the straining make an injection within the Ulcer, at the very time of injection add thereto one ounce of the best* Aqua vitæ *for every dose, or as oft as you administer the Decoction. Where by the way this is worthy your taking notice of, and we then found it by observation, that the* Aqua vitæ *(together with the aforesaid Decoction) is most powerful, and most efficacious in cleansing sordid Ulcers that are without biting, and in throughly drying of them, and in promoting the agglutination and sodering thereof. But if together with the aforesaid Decoction you add of the best* Aqua vitæ *one quart, and so destil them in a Glass Alembick, in* Balneo Mariæ, *there is from thence a most admirable Liquor to be extracted and drawn forth, both for the cleansing of al sordid and hollow Ulcers, as also for the agglutinating and closing of them up: which we at that time frequently found by experience. For truly great and admirable is the power and efficacy of* Aqua vitæ *in the cleansing and glewing together again (as it were) of Ulcers, and especially those of the Nervous parts (as we then discovered by dayly experience and observation) so that we know nothing that is better for that purpose. But when the time was come that we thought fit to restore in the Ulcer the flesh that was lost, we then made use of this other injection; the virtue and faculty whereof is, both moderately to cleanse, and to fill up the Cavity with flesh; whereupon it may deservedly be stiled a Sarcotick Remedy.*

Take *Plantane Leaves two handfuls; Agrimony, Herb Robert, Cinquefoyl Leaves, of each one handful; the tops of Wormwood, in number three; of both the Consounds, Horstail, Ceterach (or Spleenwort) St. Johns wort, of each half a handful; Betony one handful; make a Decoction in water: in the end of the Decoction add, of red astringent Wine one quart, the Leaves of red Roses, and Myrtle Leaves, whol Barley, of each two pugils or smal handfuls; take of the straining two quarts: unto which add, Beanmeal one ounce, of the bitter Vetch Orobus half an ounce, Frankincense, Mastich, Sarcocol, Rosin of the Pine-tree, of each one ounce; Myrrh, round Aristolochy, of each six drams; Florentine Flowerdeluce half an ounce, Honey of Roses four ounces: mingle them, and of this Liquor make an injection within the Ulcer; for it fitly cleanseth and generateth flesh, as we may perceive by the Nature of the Ingredients; and so the event taught us. After the injection within the Ulcer, we then very commodiously made use of this following Unguent, with tents, Spleen-like long Plaisters, &c.*

Take *Juyce of Plantane four ounces; Agrimony two ounces; Wormwood one ounce; red Wine four ounces, Oyl Omphacine of Roses one pint: boyl them together unto the consumption of the Wine and the Juyces; in the end thereof adding of Bean meal two ounces and an half, of the bitter Vetch Orobus one ounce and half, of Frankincense, Mastick, Sarcocol, Rosin of the Pine-tree, of each one ounce; Choyce Myrrh, Flowerdeluce of Florence, and round Aristolochy, of each half an ounce. Turpentine washed in white Wine three ounces, Honey scummed four ounces; Wax as much as wil suffice: make an Unguent; with the which after that we had caused Liniments to be filled, we then ordered and appointed them to be imposed upon the part affected.*

After

After the cleansing of the Ulcer was perfectly finished, we then with very good success made use of this Sarcotick Pouder likewise within the Ulcer:

Take *Elect and choyce Aloes two drams; Frankincense, the Rinds of the same, Myrrh, and Sarcocol, of each one dram; Roots of the Florentine Flowerdeluce four scruples: make of al these a most smal and fine Pouder, and apply it unto the hollow Ulcer, to fill up the Cavity thereof.*

But we likewise (after those aforesaid Remedies) thought good to make use of a drying Fomentation, fitted for the Ulcer, and such as was very requisite and proper for the producing of the Cicatrice.

Take *the Leaves of Plantane two handfuls, Wormwood half a handful, the Leaves of the Olive, of the Mastick or Lentisk Tree, the tops of the Bramble bush, of each one handful, the Leaves of Betony half a handful; the Flowers of Camomile, Melilote, St. Johns-wort, Stichados, Cassidony or French Lavender, red Roses, Rosemary flowers, the Leaves and Grains of Myrtle, of each one handful; boyl al these in a sufficient quantity of Water; and add in the end of red astringent Wine one pottle: make a Fomentation herewith for the part affected, and apply it twice a day. But when as this had first of all appeared plainly to be less effectual than was expected, and not to be sufficiently helpful; we then made use of this other that followeth.* Viz.

Take *Centaury the less-one handful; red Roses one pugil and an half; Myrrh grosly poudered three drams; Roch Allum one ounce; boyl them all together in thick red Wine for a fomentation; and then let them be filtered, and hard pressed, according to the usual manner.*

An Astringent and Epulotick Injection followed upon this Fomentation.

Take *the Leaves of Plantane, of new Ivy, the Flowers of red Roses, of each one pugil; the grains of Myrtle shaken wel together one pugil and half; the Leaves and Flowers of Centaury the less, of each one pugil; Roch Allum one ounce; Pomegranate Rinds one ounce and half; let them boyl all together in red Wine, and then strain them. Of the straining we ordered them (with a straight Syringe, Squirt, or Injection pipe) to cast into the Ulcer, the Ulcer being first of all throughly cleansed and purified: which cleansing was indeed wholly effected and wrought by the fore-ordained Injections, but more especially likewise (and most speedily) with this following Unguent; for it hath an admirable and excellent virtue in the cleansing of Ulcers from all their thin Ichorous excrements and impurities: the Ingredients that it consisteth of are these that follow:*

Take *Juyce of Smallage half a pint (this is admirable in cleansing of Ulcers) the best Honey four ounces; Barley meal two ounces; of the bitter Vetch Orobus half an ounce; Choyce Myrrh two drams; Turpentine one ounce and half; let them be boyled al together, and make an Unguent; in which let Linen Rags be wel wet, and then put into the Cavities of the Ulcer; it purgeth Ulcers most excellently, and without any biting at al.*

For the filling up of the Ulcer with flesh, we made use of this following Emplaster:

Take *Litharge of Gold six ounces; Oyl of Roses Omphacine one pint and half; Vinegar of Roses half a pint; boyl them together with a gentle fire (continually stirring them about with a Spatter) until they shal have gotten a blackish color, and the consistence or thickness of soft Bituminous Clay, and a Cerot. Make a long Roller-like Emplaster, of which make an Emplaster fit for the Ulcer, and lay it upon the Ulcer. But in the end and conclusion of the Cure, we made use of the Emplaster Diachalcitis with the Emplaster of Diapompholyx: in the curing of which so great and hollow an Ulcer (after the throughly cleansing of the same) we found by good experience, that there was nothing could be better and more available then the applying of pillows or bolsters (a little thicker than ordinary) round about the said Ulcer; and so binding these bolsters on very hard strongly to press down into the flesh lying underneath that other flesh that lay gaping far disjoyned from it: for (as Experience then taught us) this (if there be any thing that will do it) doth most especially procure agglutination and sodering together.*

Chap. 10. *Of Fistula's.*

Fistula's differ from a Sinuous and furrowed Ulcer only in this, to wit, That they are moreover callous and hard; and therefore here after sinuous Ulcers we think it fit to treat of Fistula's. If the *Sinus* or nook be not speedily cured, the *Pus* wil moreover cause furrows, such as we usually term Coney-burrows; and the part wil contract a callousness, or thick insensible brawniness; and it wil become so hard that it can by no manner of means be agglutinated and united again unto the parts lying underneath; which Malady is after this called a Fistula. For a Fistula is a *Sinus* (nook, or furrow) narrow and long, or a Sinuous ulcer, that is (for the most part) narrow and callous; and thereupon such as wil hardly admit of any Cure.

The Causes.

But now these Fistula's for the most part have their original from Impostumes. For these (either by reason of the impurity of the body, or the too great abundance of naughty humors) if they

be permitted long to continue; or else if by the unskilfulness of the Physitian they shal be over long delayed, and not wel cured, the *Pus* then causing the aforesaid Coney-furrows, they wil at length become very deep, and withal callous, and of an insensible brawny hardness.

The Differences.

There is moreover of Fistula's very great variety and diversity. For of these some are profound and deep, others of them straight, and others lie transversly, and overthwart the flesh: again, some of them are simple, single, and alone, but others of them taking their rise and beginning from one and the same orifice are double, or even likewise threefold, or oftentimes they have very many *Sinu's*, or hollow nooks: and lastly, some of them tend unto and terminate in a Bone, others tend unto a Nervous part; and a third sort of them even unto the Veins or Arteries.

Signs Diagnostick.

But now these Fistula's (in the general) are known especially by the Probe or Instrument that is conveyed into the *Sinus* (to discover the depth thereof) which how it tendeth and passeth along, and how deeply it penetrateth is easily seen and discerned. And withal when the searching Instrument is drawn forth, we may then easily learn, whether the Fistula be moist, or whether it be dry. But if it be oblique, so that the Instrument cannot pass along in a direct and straight manner, we then are wont to put in a little long plummet of Lead, or rather (which is much the better) a Wax Candle, that may be turned about any way. And moreover, that flesh that lieth round the Fistula appeareth to be white, dry, hard, and without pain; or else if there be any pain, it is very little and moderate, unless haply it be neer unto a Nerve; and the *Pus* that issueth forth is crude and raw, and somtimes likewise very stinking & loathsom. But now whether or no there be one, or more of these *Sinus's*, this is altogether to be discovered by the Probe or searching Instrument; which the *Pus* likewise that is now and then sent forth wil sufficiently evidence. For if there flow forth more *Pus* then what probably can be contained and generated in one only *Sinus*, or hollow Nook; or if when the sick Person removeth and changeth his seat, that *Pus* that before was stopped shal begin again to flow forth; this may be a sure and certain sign and token that there are here present more then one of the *Sinus's* and that the Fistula penetrateth very deep. But if there are more orifices of the Fistula, then we cannot so easily discover by the Instrument, whether there be one only Fistula, or more: but then by a Syringe, Pipe, or Squirt, liquor is to be injected by one orifice; the which liquor if it flow forth again by all the orifices then it is al but one Fistula: but if it issueth not forth at all the orifices, then there are more Fistula's then one. And this is likewise discovered by the colour of that that issueth forth: for if that humidity that floweth forth by all the orifices be of one and the same colour, it is then a sign that the Fistula is but one; but if it be of a different colour, it is then an argument that there are more Fistula's then one. But how far the Fistula's reach, and in what part they end, it may thus be known. If that which is touched by the Instrument be soft, and the *Pus* that floweth forth be white, and in great abundance, it then sheweth that the Fistula sticketh in the Skin alone. But if it penetrate and reach even unto the Nerve, then there wil be great pain perceived when the depth of the *Sinus* is searcht unto; and the *Pus* that is evacuated is indeed white, but then it is very thin, and in less plenty; and the action of that Member unto which the Nerve tendeth, is rendred more difficult. If it penetrate unto a Bone, there is then present a pain in the very time of making the tryal and discovery; and that unto which the lowest end of the searching Instrument reacheth is hard, and maketh resistance. And the Bone is then indeed found and perceived to be equal and smooth, if it be not as yet become rotten and corrupted; but if putridness hath seized even upon the Bone it self also, it then appeareth rough and unequal unto the touch; and the *Pus* flowing forth waxeth black, and is of a very ill favor. But if the *Sinus* reach unto a Vein, or an Artery, and this Vein or Artery be not indeed corroded and eaten through, then there is somthing issuing forth that is like unto Feces or Dreggs. For the Blood sweating through by the Pores of a Vein, or an Artery, is mingled together with the humidity of the Ulcer; and thence it is, that what floweth forth appeareth feculent, or dreggy. But if the Vein or the Artery be eaten through, then sometimes there wil blood break out, and flow forth: and this wil be very red, and with a kind of leaping or dancing motion, and with a tickling, if it come from an Artery; but more thick and dark, if it issue forth from a Vein.

Prognosticks.

1. Simple or single Fistula's that are yet but new begun, which are in the fleshy parts alone, not deep, in young vigorous bodies, and such as are of a good Constitution, are easily cured; but more difficultly those wherein many parts are corroded, and eaten quite through, such as are old and inveterate, without any sense and feeling, deep, ful of turnings, and having divers and different hollow Nooks; such as are neerly situate unto noble and principal Members; and when they are in old and decaied bodies, and such as abound with ill humors.

2. And so are those (in like manner) very dangerous, and hardly cured (or rather indeed altogether

altogether incurable) that reach even unto the heads of the Muscles, unto the Veins, unto the Arteries, unto the Nerves, the Bones, the Joynts, and the very Vertebræ of the Back; that reach and extend unto the Cavities of the Bellies, as the Thorax, or the Abdomen or Paunch; or even such as penetrate likewise unto the very Bowels themselves, as the Lungs, Womb, Intestines, and also unto the very Bladder it self. For why, such like Fistula's as these, either they wil not bear nor admit of any Medicaments, or it may happen likewise that the Medicaments cannot possibly attain and reach unto them.

3. Yea some certain Fistula's there are that indeed ought not to be cured; to wit, such as are old and inveterate, as having been of long continuance, and such as are removed from the noble parts, and such as by the superfluous and vitious humors have now of a long time been accustomed to be purged and emptied forth. For such like Fistula's as these (in regard that they preserve men from divers Diseases) are by no means to be closed up; because that when they are shut up they cause and procure very many Diseases; as *Hippocrates* hath it, in his sixth Book of Epidem. Comment. 3. Text 39. But on the Contrary, if they shal at any time chance to be closed and shut up, they are then again to be opened.

The Cure.

Now the Cure of these Fistula's is twofold; one the true and perfect Cure; the other only palliative (as they call it) or imperfect, to wit, such as wherein the Fistula is dryed up within, and consolidated without, the *Sinus* nevertheless stil remaining. Which kind of Cure *Galen* seemeth to hint unto us in his Book of Tumors, Chap. 4. where he hath these words. *Yet nevertheless* (saith he) *the* Sinus *is streightned and closed together, as being throughly dryed by the Medicaments; insomuch that the part may seem to have attained unto a soundness no way to be found fault with. For evermore indeed, if any one continually using an exact and accurate Diet cometh by this means to have his Body very healthful and sound, and very free from superfluities, the* Sinus *then remaineth restrained and kept in. But so soon as any superfluity is collected, and gotten together, it is again filled up; and so there appeareth to be again the same Impostume that there was from the very first; and so again it is evacuated (as is fitting) with Medicaments, and then it is dried, and by these means it is restrained and kept in; and all this is evermore done with much more ease unto the sick Party, then in those that have the Impostume newly begun in them. For neither do the parts that are so far divided and separated, yet feel, or are in the least sensible of pain: for now although they are far distant one from another, yet nevertheless they are very speedily filled up, the* Sinus *easily and soon receiving that that floweth unto it.* And the truth is, *Hieronymus Fabricius ab Aquapendente* is of Opinion, that this kind of Cure is not altogether to be despised, and contemned; For sometimes (as he writeth) this succeeded wel unto him, although not alwaies. Now the Cure is performed, the body being first of all purged, and a fitting Course of Diet ordained; and afterwards the Tents and Fistula being taken away, and a new Spunge throughly soaked in a liquor that is strongly drying being applied and fast bound upon the place; such as is the water of hot Baths, Ley, Lime-water, and the like. For by this means the mouth of the Fistula shutteth again together, so that the Fistula may seem whol and sound; which indeed somtimes by the benefit only and operation of the Native heat doth altogether coalesce and grow together again; but for the most part it remaineth closed up only so long as there are no superfluous humors collected and gotten together in the body, for after that there is any humor again gotten together in the *Sinus*, the Fistula is likewise again opened.

But now the true and genuine Cure of a Fistula is thus accomplished. Universals in the first place are not to be omitted, but a Diet is rightly to be instituted, and the body throughly purged from all superfluous humors; and especial care is to be taken, that there may no more of the humor flow in unto the part affected. Which being done, before we descend unto Topical Remedies, there be some that administer certain Potions that may dry the Interior parts, and strengthen them, and that may prepare the Fistula for Consolidation, and may throughly purge it. Of such like Potions *Tragaultius* hath described two: the former whereof is this.

Take *Agrimony three parts, Plantane two parts, Olive Leaves one part; Cut them smal, and bruise them wel, and then boyl them in white Wine*; let the sick Person drink hereof a small Cup full (three or four ounces) every day. Or,

Take *Osmund (or Water-Fern) three parts, Gentian two parts, Centaury one part; boyl them in the same manner (as aforesaid) in white Wine; which Potion expelleth and driveth forth likewise Bones that are corrupted.* Others there are that commend this Potion.

Take *Sanicle (i. e. Bears Ears, or French Cowslips) Mugwort, Speedwel, Saracen Consound, Winter-green, of each one ounce; Savine one ounce and half, Horse-tail half an ounce; boyl them in white Wine, and make a Potion*; which if we wil at any time make stronger and more operative, we may then (in the drinkng of it) unto each Dose add and mingle therewith half a scruple of *Oculus Cancri* (or the Crabs Eye) prepared.

For Savine, and Crabs Eyes, are of singular use

and

and benefit in the expelling and driving forth of corrupted Bones, *Pus*, putrified Veins, and the like. Or,

Take *Saracen Consound, Sanicle, Speedwel, of each one ounce*; *Tormentil Root half an ounce*; *Avens, and Carduus Benedictus, of each an ounce and an half*; *boyl them in Wine.*

Afterward, before any thing else be done, we must do the utmost of our endeavor that the callous hardness and brawnishness may be removed. But now whenas the narrowness of the orifice of the Fistula doth for the most part hinder the application of those Medicaments that are to be administred for the removal of the callous hardness, it is therefore to be dilated: which may be done either by fire, or by an Iron Instrument; or else more commodiously, and without pain likewise, by long sharp tents that are made of Sea-Spunge, the pithy substance of the Elder-tree, the Roots of Gentian, Aristolochy, Briony, or even likewise of the wild Rape throughly dried. For these things being formed into a Pyramidal figure, and put into the Fistula the sharp-pointed end downward, they soak up the humidity of the Fistula, and by this means they are rendered the thicker, and so by little and little they dilate and widen the orifice, without any pain at al. Which things are somtimes likewise soaked and anointed over with such Medicaments as are in their own nature fit to take away the callous hardness, when the callus hindereth the dilatation. For there ariseth a callousness (especially in the external orifice of the Fistula) to wit, in the very skin it self, it being such as easily becometh hard, and such as is made thicker than the flesh, that is softer, and easily receiveth in the excrements, and the humors that flow thereunto. Yet nevertheless the very flesh it self somtimes likewise getteth a callous hardness in the cavity of the Fistula. The callousness that is in the orifice of the Fistula is sufficiently apparent both unto the touch, and to the sight. But now whether there be any callousness likewise in the *Sinus* it self, this may be discovered by the searching Instrument. For when the Instrument is put into it, there is then perceived very little or no pain, and there is no blood at al issueth forth, but there is a certain hardness perceived, if a *Callus* be present. Which if it be absent then there is a great pain excited, the blood floweth forth, and there is no hardness at all perceived.

But now wheresoever this *Callus* is, it is to be removed; which is done, either by Medicaments, or by Cutting, or by the Fire. But then likewise Medicaments are to be administred, somtimes such as are mild and moderate (and such are Emollients and Digestives) and somtimes again those that are stronger, and such are Detersives or Cleansers: and lastly, now and then also, the strongest sort of al, and such are Caustick. In those that are but young, and in their youthful age, and that have their flesh soft and tender, here Emollients and Digestives only are sufficient, which do dissipate the said *Callus*, and the matter that is impacted and stuffed into the part that constituteth and causeth the *Callus*; unto which we may likewise (if there be occasion) add and mingle therewithal some of the Abstersive and Cleansing Remedies. And such are the ashes of Figs mingled with the fat of a Goose; the Decoction of Fern Root, of Agrimony, of Olive leaves, the great Diachylon, and the Unguent Apostolorum. But for the most part there wil be need of the stronger and more forcible Remedies, which by cleansing, or likewise by burning do waste and consume the aforesaid *Callus*. The stronger sort of Medicaments are, the Root of *Spondylium* (we usually cal it Cow-parsnep, or Meadow-parsnep) peeled and pared round about, Asphodel Root, Snakeweed, Briony, the Decoction of Lupines, and especially (above al) the lesser Centaury. There are some likewise that make use of the Root of black Hellebor; and this they put for three daies into the Fistula. But *Antonius Chalmeteus* pre-admonisheth us touching this Root, and he tels us that it is a very unsafe and dangerous Remedy, and especially if the Fistula be in any part of the *Thorax* or Chest. For when on a time he himself (as he saith) had once, and but once, filled with Hellebor a Fistula that was in the *Spina Dorsi*, neer unto the Region of the Heart, the sick person very often fel into fainting and swounding fits. Those things that are yet stronger, are, the Ægyptiack Unguent, Vitriol burnt, Vitriol precipitate, the Oyl of Sulphur, Trochisques of Minium, Chalcitis, and that which by the Apothecaries is called *Misy*, and *Sory*; out of which there may be made Compositions for the present use. *Celsus* in his fifth Book writeth that this following is found by good trial and experience to be of singular use; and *Paulus Ægineta* doth the like also in his fourth Book, and Chap. 49. in which place we may see more hereof.

Take *of the Rust and soil of Brass twelve drams*; *Ammoniacum two drams*; *Let the Ammoniacum be dissolved in Vinegar, and the aforesaid Soil of Brass therewith mingled.* Or,

Take *strong Ley four ounces*; *the Decoction of Lupines one ounce*; *Honey of Roses strained one ounce and half*; *Allum half an ounce*; *and mingle them.* If we mind to add any further virtue and strength thereto, to make it the more operative, we may then add half a dram of Precipitate Mercury. Or,

Take *the best Wine Vinegar three parts*; *of the oldest Oyl two parts*; *Litharge one part*; *let the Litharge be bruised in a Mortar with Vinegar*: *and afterward let them boyl al together, until they have gotten both the color and consistence of Pitch*;

Pitch; of which we are then to form long sharp Tents, for the present purpose. Or,

Take *Litharge half a pound; boyl it in Vinegar and Rose water; and then strain and filtrate it.* Afterward,

Take *Calcined Tartar as much as wil suffice; dissolve it in destilled Vinegar: Mingle the Waters, and make thereof that they term* Lac Virgineum, *or Virgins Milk.* Or,

Take *of the Egyptiack Unguent half an ounce; Sublimate half a dram; Ley one ounce; Rose-water two ounces; Plantane Water four ounces; and then let them boyl a little.*

The green Water above mentioned and described is likewise very useful.

But yet nevertheless, if the narrowness and depth of the Fistula hinder the fit application of these Medicaments (as for the most part it so falleth out) then the said Fistula is either wholly to be opened, or else the Medicaments are to be injected even unto the very bottom thereof. When you have a mind to open the Fistula, then let the searching Instrument be first of al conveyed thereinto, and so let it be opened upon the said Instrument. But if it be not thought fit to open the whol Fistula, then Medicaments are to be injected, and these must be either liquid or dry. The liquid are injected by a Funnel or Squirt; and they are to be washed with Ley, Mulsum, Sea-water, Lime-water, the Water of hot Baths, Aqua vitæ, or the Spirit of Wine; of which last this is by the way to be observed, that if it be mingled together with other convenient Medicaments, it is then of singular use and benefit in the cleansing and drying of sordid Ulcers; as we may see in *Valeriola* his fourth Book, Observat. 10. and in his fifth Book, Observ. 1, 7, 8.

But the dry are made into a Pouder, and blown into the Ulcer by a Quil put into the mouth of the Fistula; especially if the Fistula be but short and within the flesh: but if it be long, it may likewise be opened on the opposite part, that so on both sides the Medicament may be injected. Where this is not to be passed over in silence (touching which we likewise gave you notice before, in the Cure of *Sinus*) that we use our utmost endeavor, that the orifice of the Fistula may be open downward toward the Inferior parts, that so the Humors may the more freely flow forth; or if it be not open, then in that very place the Fistula is to be opened, unless there be some great and weighty impediment to hinder the same.

The opening of a Fistula.

But when notwithstanding al the Medicaments the Fistula yieldeth not, neither giveth place at al unto the most prevalent Remedies that have or can be administred; and that somtimes in this case the operation of the hands bringeth more assistance, help, and benefit, we are somtimes likewise to betake our selves unto the Iron Incision Knife, and the fire it self. To wit, the whol *Sinus* is to be opened; which yet nevertheless it wil not be safe for us to attempt in those Fistula's that reach unto the great Arteries, or the Nerves, or the Tendons, or the Membrane that girdeth in the Ribs, or any other parts that are of the like Nature with these. But whensoever this opening shal be judged fit and feasible, the *Sinus* being then first of al searched by the Probe, or by some Liquor cast into it, the whol (such as it is) may be opened. The Fistula being opened, the callous hardness ought either with Medicaments, or the edg of a Pen-knife, or a Razor, to be drawn forth, even so far until we come unto the good and sound flesh; which may be perceived, not only by the color, but even likewise from the blood, and the sense of pain. The same kind of *Callus* (if it be extraordinary hard) may most chiefly be taken away with a red-hot Iron; this being done as with most speed, so with the least sense and feeling of pain. But nevertheless the fire doth so terrifie and affright people, that few or none wil admit of this Remedy. But yet in the mean time while these things are in doing (whether it be by Caustick Medicaments, or by the fire-hot Iron, or by the fire it self) the part is al the while to be wel guarded round about, with some one or other Defensive Cooler and Repeller, lest that upon the exciting of pain an Inflammation should be raised.

The Fistula being thus throughly dried, and burnt, we are then to make use of some mitigating Medicament, and such as may loosen and cast off the crustiness thereof. But if the Fistula reach unto, and end in a bone, this so soon as it is discovered by the Section, we must with al care and diligence pare and scrape away whatsoever we find to be corrupted and black in the said bone: and this indeed must be but only in the very superficies of the bone: for if the rottenness hath further corrupted the said bone, then the scaly corrupted part thereof is to be cut forth with a Wimble, unless it fal forth of its own accord; but if the rottenness shal have penetrated even unto the marrow of the bone, then that that is corrupted is to be taken out with the Cizers that are for that purpose. But lastly, if the Bone be wholly corrupted, then al the whol bone is to be taken forth; which may indeed be done in smal bones; but it cannot be so done in others. The bone being now purged, those things are afterward to be administred that are called Incarnatives, viz. Such Medicaments as generate and breed flesh. Unto which if the Fistula give not place, it is then a sure sign that as yet al that that was corrupted is not wholly taken away. The Fistula is thereupon to be opened deeper, and the bone to be scraped with al the utmost diligence and care that may be, and then it must be further cleansed. But if the Fistula wil not yet after al this be cured, we may without al doubt conclude, that it hath penetra-

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ted so deep into the body, that it is altogether impossible to find out the end & bottom thereof. And therefore the whol business is then to be committed and left unto Nature: which yet nevertheless we may likewise assist and help with Medicaments; for which end and purpose *Nicholaus* the Florentine prescribeth this following, which (as he saith) wil both draw forth the bones that are broken and corrupted, eat through the naughty putrefied flesh, and heal the Fistula.

Take *Salt torrefied by the fire, Tartar, and Agarick; let them be made into a very fine Pouder; and then this Pouder being tempered together with Honey, let it be imposed upon the Fistula.*

The Callus being now removed and quite taken away, if there be any thing sordid and foul yet left remaining, we must then make use of Detersive and Sarcotick Medicaments. For which end, Pimpernel, Golden Rod, Centaury the less, the Root of Aristolochy, and the like, are to be administred.

Take *Turpentine washed in the Spirit of Wine three ounces; the Juyce of Smallage three drams; Pimpernel half an ounce; Honey of Roses strained, one ounce and half; let them boyl until welnigh the one half of the Juyces be wasted away. Afterwards, add of round Aristolochy one dram; the meal or flour of Lupines three drams; Myrrh one dram: mingle, &c.*

Which said Medicament, either the Tents may be dipped in it; or else it may in some other manner be administred unto the Fistula.

There is extant in St. *Augustines* 22. Book of the City of God, and Chap. 8. a most miraculous Cure (and such as is wel worth the reading) of a Fistula by devout Prayers.

Chap. 11. *Of an Ulcer, with Vermine, or Worms breeding therein.*

AND sometimes likewise Worms are generated in Ulcers. But now what the cause is of the breeding of these Worms, we have already told you in the second Book of our Institutions, Chap. 9. and in the third Book of our Practice, Part 2. Sect. 1. Chap. 5. What was there spoken hath here place likewise: for Worms are generated in Ulcers that are sordid and foul, and which were not cleansed as they ought to have been, neither purged from their *Pus* and *Sanies*; and this especially if it be in the Summer time, and the Air being hot and moist.

Signs Diagnostick.

If the Ulcer be open, then the Worms appear unto the sight; but if by reason of the streightness and narrowness of the Ulcer the Worms cannot be seen, they may yet be known by other signs; by a certain biting, both of pricking and pain, and by the sense of motion. And there is most commonly likewise a certain stink perceived in those Ulcers.

The Cure.

The whol business and substance of the Cure consisteth in this, to wit, that the Worms be taken away, and the putridness of the Ulcer be hindered and prevented. If therefore the Worms lie open, and may be discerned, they are then to be drawn forth with Instruments fitted for the same purpose: but if they lie hid, or stick so close and fast unto the part that they cannot be drawn forth, they are then to be killed with Medicaments that may likewise withal take away the putridness, and the overgreat humidity of the part; and this is done by Medicaments made of Wormwood, Horehound, Dittany, Fern, Scordium or Water Germander, Featherfew, Centaury the less, the Leaves of Peaches, Lupines, Gentian, the Gall of a Bull, Aloes, and Myrrh. As,

Take *Wormwood, Centaury the less, Horehound, of each half a handful; boyl them in ordinary Spring Water, and strain them: Take of the straining half a pint; Honey two ounces; Aloes two drams; Mingle them, &c.* Or,

Take *Gentian Root half an ounce; white Hellebore two drams; Dittany of Candy, Wormwood, Centaury the less, of each half a handful; boyl them in a sufficient quantity of Water; then take of the straining six ounces; the Elixir of Propriety two drams; Mingle, &c.* Or,

Take *Unslaked Lime a sufficient quantity; extinguish it with Wine Vinegar; and afterward let it be stirred wel about with Oyl of Roses, that so a Cataplasm may be made hereof.* Or,

Take *Aloes two drams; Myrrh poudered one dram; the meal of Lupines two drams; Bulls Gall half an ounce; Flour of Bras one dram, Honey as much as wil suffice, and make a Liniment.* Or,

Take *Meal or flour of Lupines three drams; Elixir propriet. two drams, Buls Gal three drams, Honey a sufficient quantity, and make hereof a Liniment.*

Chap. 12. *Of a Varicose Ulcer.*

TOuching *Varices* we have indeed spoken above, in the first part, Chap. 44. yet notwithstanding it sometimes so happeneth, that an Ulcer may be joyned with, and accompany these *Varices*; and this Ulcer they cal a varicose Ulcer. Which Malady is easily known from the signs of a *Varix*, and from Ulcers.

Now this varicose Ulcer cannot be healed, unless the *Varices* be first of all healed, as *Galen* teacheth

teacheth us, in his fourth Book of the Method of Phyſick, Chap. 2. And therefore whenſoever at any time we are minded to take in hand the Cure of ſuch an Ulcer; in the firſt place the Cure muſt be directed unto, and look toward the ſaid Varices; which how it may be accompliſhed, we have told you in the place before alleadged. Now there is extant (in *Gulielmus Fabricius* his fourth Century, and Obſervat. 85.) a Hiſtory of this varicoſe Ulcer, how it was cured: the Hiſtory he relateth in theſe very words. *In the yeer* 1589. (ſaith he) *when I returned home unto my Fathers Houſe out of* France, *I was called unto a certain Patient here in the Neighborhood, a man about fourty yeers old, very ſtrong and able of Body, and of the beſt Conſtitution,* Adolphus auff dem Bruch *by name. This man was ſorely troubled with a malignant and inveterate Ulcer in his left Leg, together with a Varix of an extraordinary great bigneſs: for it was as thick as my Arm neer unto the Hand-wriſt, and almoſt a ſpan long. But it began in his Ham, and thence deſcending downward toward the Feet it fetcht a ring, and made two circumvolutions. But it was notable to obſerve, that ſo ſoon as ever he lifted up his Leg on high, the blood immediately retired; but the Leg being ſet again upon the ground the blood again deſcendeth, and that in a very moment; and (that I may tel you in a word) the blood ebbed and flowed, no otherwiſe then as if in ſome hollow Pipe or Conduit it had been caſt, firſt into this, and then into that part thereof.*

The Hiſtory of a monſtrous Ulcer

Moreover, it being ſo that varicoſe Ulcers can by no means be conſolidated unleſs the Varix be firſt cut forth, I therefore thus ſet upon the Cure. Having appointed my Patient a good and wholſom Courſe of Dyet, and now and then alſo throughly purging his Body, and opening the Arm-Vein of the ſame ſide, and putting the ſick Perſon upon a Bench, I then eaſily and gently ſeparated the Skin in the Ham from the Vein it ſelf. And then with a Thread twice doubled (which I conveyed in by a Needle that I crooked on purpoſe) I laid hold on the Varix; and in the lower part of the Varix I proceeded in the very ſame manner. But before ever I would draw the Thread cloſe, and tie the knot, I commanded that his Leg ſhould be again ſet upon the ground from off the Bench; and this I did to this end, that the blood might in manner as aforeſaid flow downward: for I much feared leſt that the Blood by reaſon of its ebbing and flowing being made very thin and ſubtile, ſhould here cauſe ſome inconvenience, or other, &c. See what further followeth in this Hiſtory, in the firſt part of this fifth Book, Chap. 44. in the Concluſion of the ſaid Chapter, in which we treat of *Varices*.

Chap. 13. *Of an Ulcer with the rottenneſs of a Bone.*

IT happeneth likewiſe ſomtimes that a rotten and corrupted bone lieth under the Ulcer. Now Bones are corrupted, and contract a rottenneſs, either from internal Cauſes, to wit, the long afflux of the excrementitious humors unto the bones, or elſe the venemous quality and acrimony of the *Sanies*, or elſe by ſome hidden propriety; like as it often happeneth in the French Diſeaſe, that the very bones become rotten, the Skin in the mean time remaining whol and ſound. The external cauſes are, the Ambient Air, eſpecially that that is cold, a contuſion or bruiſe, an Inciſion, and tart or ſharp Medicaments.

Signs Diagnoſtick.

If the Bone be in the open view, the corruption thereof doth then eaſily appear, becauſe (as *Celſus* writeth in his eighth Book, and Chap. 2.) that that is vitiated at the firſt appeareth almoſt as if it were fat, and afterward, either black, or rotten. But although the Bone lie hid, and do not in the leaſt appear, yet nevertheleſs its Corruption diſcovereth it ſelf by certain Signs. And if a Fiſtula went before, or that there were an Ulcer of a long continuance, then the Bone is corrupted by the touch of the *Pus* and the *Sanies*; touching which *Hippocrates* thus writeth, in the ſixth of his Aphoriſms, Aphoriſm 45. *If the Ulcers* (ſaith he) *be Annual, and ſuch as return yeer after yeer, or if likewiſe they be of a long continuance, then there will neceſſarily follow an Impoſtumating and putrefying of the Bone, and the making of hollow Cicatrices.* Moreover, he ſaith that ſuch like Ulcers are indeed ſometimes brought unto a Cicatrice, but that they are ſoon after again renewed, the Cicatrice being broken. For the humor and the *Sanies* that ſweateth out of the corrupted Bone eateth through the Cicatrice, and reneweth the Ulcer. And therefore if there be any Ulcer often renewed, it evermore giveth us great cauſe to ſuſpect that there is one or more Bones corrupted, as *Galen* tels us in his Comment. upon the ſixth Book of the Aphoriſm. Aphor. 45. and *Paulus Ægineta* in his fourth Book, and Chap. 10. And this is oftentimes to be ſeen in the rottenneſs of the Teeth, out of which there ſtilleth forth a *Sanies* through the holes of the Cheek or Jaw-bone, and there in the external part of the Jaw it exciteth and cauſeth an Ulcer: which although it may be, and oftentimes is healed, yet notwithſtanding after a very ſhort time the Cicatrix is again broken. If ſuch an Ulcer therefore appear in the Cheek, and be there often renewed, the Teeth are then to be looked into, and if there be any one of them rotten, it is forthwith to be drawn. For the Ulcer cannot poſſibly be per-

fectly and wholly healed, before the Tooth that supplieth the material cause unto the Ulcer, be drawn forth. Thirdly, the flesh that lieth above upon the Ulcer is soft and flaggy; for it is made thus soft by the *Sanies* that sweateth as it were out from the Bone: and sometimes likewise it becometh wan and Leaden-coloured by reason of the vitious humor that floweth forth from the Bone; in the seventh Book of the Aphorisms, Aphor. 2. Fourthly, the *Sanies* that floweth forth of the Ulcer is more abundant then what is usual, considering the bigness of the Ulcer; it is likewise thin, stinking, and of very ill consequence, as *Galen* tels us in his third Book of Fractures, Tit. 18. And if there be a dry Liniment put into the Ulcer, so that it may reach even unto the very bone; and the next day drawn forth again, it will stink loathsomly. And lastly, if the Probe or searching Instrument be conveyed into the Ulcer, even unto the very bone, then the said Ulcer is not found to be smooth and slippery, and hard, but unequal, rough, and soft.

But whether this rottenness be deep, or only superficial, *Celsus* in his eighth Book, and Chap. 2. teacheth us how we may discover it in this manner. *If* (saith he) *a slender and smal Probe be thrust into the hole of the Ulcer, it will by its more or less entring thereinto give us sufficient notice, whether the rottenness be in the top and superficies only, or whether it hath descended deeper. The blackness likewise of this* Sanies *and rottenness may rightly be gathered from the pain, and from the Fever; which if they be mild and moderate, it is then an Argument that the said rottenness hath not descended very deep: but when the aforesaid Symptoms are great, then the rottenness hath gotten down very low and deep; but it will appear yet more manifestly, by turning about the Wimble in it. For there is then an end of what was amiss, when there ceaseth to come forth any more of the black scurfiness.* Thus *Celsus.*

Prognosticks.

1. All rottenness in the bones hindereth the Cure of the Ulcer; neither can any Ulcer be perfectly healed, under which there lieth a bone that is corrupted.

2. If by reason of the diseased and rotten bone the flesh be become blackish, and of a Leaden colour, it then betokeneth much evill; 7. Sect. Aphor. 2. For as *Galen* Comments upon the aforesaid Aphorism, it signifieth no mean and smal distemper of the bones, but an extraordinary corruption of them.

3. If the rottenness of the bones be neer unto the Nervous parts, as in the Hands, or Feet, or else in the Joynts, and heads of the greater bones; or otherwise about the heads of the Muscles, and the Nerves, and the Tendons; it is not in any of these cases easily cured; in regard that we cannot with any safety make use of, or appoint any Chirurgical operations.

4. The Cure (in like manner) is altogether as difficult, if the rottenness be about the great Arteries, and the Veins.

The Cure.

Besides the Indications that the Ulcer affordeth us, the rottenness of the bone sheweth us likewise that what is corrupted must be wholly taken away: for neither can that that is dead be by any means corrected, and amended. For that which is in the flesh and soft parts, we call it *Sphacelus*; but if it be in the bone, it is then rottenness.

But now that the corrupted bone may be taken away, it is first of all to be cleansed, and then made bare (if it be covered with flesh) the Ulcer being cut off. But nevertheless (as we told you erewhile) there cannot oftentimes any Section or Cutting be administred, by reason of the Nerves, Muscles, Tendons, Arteries, and the greater Veins. The bone is therefore then (as much as may be) to be cleansed with a Gentian, or Rape root, tenderly conveyed into the Ulcer. The flesh likewise that lieth at the top of the bone may be consumed by a Caustick Medicament, or by any potential Cautery, and so the bone may be bared in the same manner as Issues are wont to be excited.

The corrupted bone when it is made bare, it is then to be taken away either by Chirurgery, or by Medicaments. We must of necessity make use of Chirurgery, when the Corruption of the bone is more deep, and not in the Superficies; or when we desire a quick and speedy Cure, as in the bones of the Thorax. For Nature doth but very slowly separate the corrupted bones, and scarcely (now and then) in the space of thirty five, or fourty daies. And therefore this separation of the corrupted bone from the sound may otherwise be assaied by Medicaments.

Now those Medicaments that separate the corrupt bone from the sound ought to be very drying, that so they may consume the superfluous humidities in the corrupted bone, and that they may likewise dry even the very bone that is sound, that so the Expulsive faculty may separate from it that that is vitious in it; and that the ossifique or bone-breeding faculty may generate a bone, or at least a *Callus*, that may thrust forth the bone that is corrupted.

Medicaments, in case the Bone be corrupted

The milder sort of Remedies (for this purpose) are the Root of Sow-fennel, white Briony or white wild Vine, Flowerdeluce, Myrrh, Aloes, Alum. The stronger sort, are, the Root of round Aristolochy, of Water-dragons, the Rind of Allheal, of the Pine Tree, the Pumice stone burnt, the dross and refuse of Brass, the Mineral Chrysocol, and the Spirit of Wine. The strongest

ſtrongeſt of al; Euphorbium, than which *Fallopius* writeth that he himſelf never found any more excellent, and that would ſooner take away the corrupted bone; burnt Copperas, the aſhes of the Fig-tree, Lime, Aqua fortis, the Oyl of Vitriol, and the Oyl of Sulphur.

Of thoſe Medicaments there are Compounds to be made, which are to be applied either in the form of a Pouder; or elſe mingled with Honey, Roſin, Wax, Unguent Ægyptiack, or ſome other ſuch like Unguent, and ſo applied in the form of an Unguent.

This following Pouder is very efficacious: Viz.

Take Root of round Ariſtolochy, Flowerdeluce, Myrrh, Aloes, the Rind of Alheal, the refuſe of Braſs, the rinds of the Pine-tree, equal parts of al: let them be al mingled together, and made up with Honey into the form of an Unguent.

This Pouder following is likewiſe very much approved of.

Take Mummy, and Sarcocol, of each half a dram, Euphorbium one dram, and make a Pouder. Or,

Take the Root of round Ariſtolochy, of Sow-fennel, of each half an ounce; the rinds of the Pine-tree two drams; white Agarick, Earthworms prepared, of each one dram and half; Euphorbium one dram; make a Pouder, or an Unguent with Honey of Roſes; as likewiſe this Oyl:

Take Citrine Sulphur one pound; put it neer unto a gentle fire that it may melt; unto which add, of burnt Tartar made into Pouder half a pound; mingle them with continual ſtirring until they are cold. Afterward let them be pulveriſed, and ſet in a moiſt place upon a ſtone until they melt; and with this Oyl let the corroded bones be anointed. Or,

Take the Root of long Ariſtolochy, Briony, Sow-fennel, Flowerdeluce of Florence, of each one dram, Euphorbium one ſcruple; make a Pouder, and ſtrew it upon the bone. Or,

Take Pouder of the Root of Sow-fennel, of round Ariſtolochy, of Opoponax, and Euphorbium, of each half a dram; Turpentine an ounce and half, Wax half an ounce; boyl them to the conſiſtence of a Cerote. Or,

Take the Roots of both Ariſtolochies, of Briony, of Sow-fennel, of Florentine Flowerdeluce, of each half an ounce; Centaury the leſs, the Rind of the Pine-tree, of each three drams; Aloes two drams, flour of Braſs a dram and half: unto al the aforeſaid pour of the Spirit of Wine as much as wil ſuffice, and extract the Tincture.

But if the corruption of the Bone be ſo great that it cannot be wholly taken away by Medicaments, then there wil be need of Chirurgery; and the corrupted bone is to be taken away, either by ſhaving and paring off, or elſe by burning. Now for the abraſion or paring it away, there are here two Inſtruments that are made uſe of; the ſcraping Iron Inſtrument, and the Wimble or Auger. The former of theſe taketh place, when the bone is not ſo deeply corrupted; but the Wimble is to be uſed when the rottenneſs hath penetrated very deep into the bone. Of ſhaving or paring, *Celſus* in his eighth Book, and Chap. 2. thus writeth: *He that ſhaveth theſe rotten Bones* (ſaith he) *muſt with al boldneſs and courage make an impreſſion with his Iron Inſtrument, that ſo he may do ſomwhat, and may the ſooner make an end. The end is then, when we come either unto a bone that is white, or unto a bone that is ſolid: for it is manifeſt by the whiteneſs of the bone that the fault in regard of the blackneſs is cured; and by that ſame ſolidity it is likewiſe manifeſt that what was amiſs in the bone in regard of the rottenneſs, is in like manner ended. We alſo told you before that unto the ſound and whol bone there wil be ſome ſmal acceſs of Roſie freſh-colored blood. But if at any time it deſcend deeper, we may wel queſtion both of them, as very doubtful: as for the rottenneſs, our knowledg is indeed therein ſomwhat quicker. A ſmal and ſlender Probe is put down into the hole, which by its entering more or leſs, ſheweth unto us whether the rottenneſs lie in the top, or whether it be deſcended deeper. The blackneſs may likewiſe indeed be gueſſed at (if not certainly known) from the pain, and from the Feaver; which if they be mild and moderate, then we may conclude that the ſaid blackneſs is not deſcended very deep; but yet nevertheleſs it is made more manifeſt when we come to make uſe of the wimble; for there is then an end of what was amiſs, when there ceaſeth to come forth any black duſt. And therefore if the rottenneſs hath deſcended deep, we ought then to make many holes (with the wimble) as deep as that that is amiſs in the bone: and then into thoſe holes burning hot Irons are to be let down, until at length by this means the bone be wholly dried. For withal (after this) both whatſoever is vitiated and corrupted wil be looſened from the lower bone, and that hollow nook wil be filled up with fleſh: and the humor that afterward iſſueth forth wil be either none at al, or certainly very little. But if there be any blackneſs, or if the rottenneſs be likewiſe paſſed over unto ſome other part of the bone, it then ought to be cut out; and this ſame may likewiſe be done in the rottenneſs penetrating into ſome other part of the bone: but that which is altogether vitiated muſt be wholly taken forth: if the inferior part be whol and ſound, then only ſo far as there is any corrupted, it ought to be cut forth. And alſo whether the Breaſt-bone, or whether it be a Rib that is rotten, it is rendered by this fault unuſeful, and therefore there is a neceſſity of cutting it forth.* Thus *Celſus*.

By al which it appeareth, That the Ancients after the paring and ſhaving of the bone were wont likewiſe to burn it, this burning being the

chiefest remedy for the consuming of al the excrementitious humidity. But then notwithstanding in the applying of a Cautery we must alwaies beware, lest that the flesh that lieth neer be likewise burnt together with the corrupted bone: and therefore the Cauteries are to be applied through Iron pipes, by which the flesh is to be defended and safeguarded; of which Iron pipes we ought to have many in readiness, that so after one is grown hot, another that is cold may be applied; or if we think good to make use of one only, then as oft as it is hot we may put it into cold water to cool it. And whatsoever of the humor sweat forth out of that bone, it is to be cleansed and wiped away with a Spunge or a Linen cloth, lest that otherwise it corrupt the neerly scituated parts. After the burning, we are then in the first place to apply Rose-water with the white of an Egg, for the preventing of the Inflammation, and the moderating of the pain; afterward we are to administer the Oyl of Roses with the Yelk of an Egg; and then after this, Butter with Honey of Roses. But unto the bone that is burnt, the Pouder of the Root of Sow-fennel, of Aristolochy, Euphorbium (or some other of the forementioned Remedies) is to be imposed and laid upon the corrupted bone, until the said bone be separated, and parted.

After the taking forth of the corrupted bone, some drying Pouder (and such as are called Cephalick Pouders) is to be strewed upon the place. After this the Ulcer is to be filled up with flesh; and at length to be closed and shut up with a Cicatrice.

Chap. 14. Of *Ulcers hard to be cured, commonly called* Cacoethe, Telephium, *and* Chironium.

THere are Ulcers likewise that are here and there in the Writings of Physitians termed *Dysepulote* Ulcers, *Cacoethe*, *Telephia*, *Chironia*, and *Phagedæna*; which what they are, we shal in this and the following Chapter explain unto you. And in general, al those Ulcers may be called *Dysepulote* (or hardly healed) that are not to be cured without much difficulty, and such as are not closed up with a Cicatrice without much ado. Touching the right curing of which *Galen* wrote both the fourth Book of his Method of Healing, and his fourth Book of the Composition of Medicaments according to their kinds. And this indeed happeneth for four causes, as *Galen* tels us in his fourth Book of the Method of Healing, Chap. 1. For of those Ulcers that are hardly cured and rebellious, some of them are made such by reason of the distemper in the ulcerated part, and others of them become such by means of the humor flowing in unto them. But now this very distemper may again be said to be twofold, since that the subjected flesh is somtimes such as hath exceeded the bounds of Nature, in the quality only; but somtimes likewise with a certain necessary Tumor or swelling. And in like manner, the afflux of humors admitteth of a twofold division; to wit, into, First the bad and depraved quality, and secondly, the excessive quantity of the humor or juyce that floweth in. But in the mean while, either some, or else al the aforesaid *Affects* are alike and indifferently mingled together. Yet nevertheless, the same *Galen* in the sixth of the Aphorisms, Aphor. 45. addeth a fifth cause; where he writeth, That Ulcers remain a long time, not only because of the afflux of humors, or by reason of any disposition in the Member contracted from the humors flowing in; but also (thirdly) by reason of some passion of the bone that is corrupted in that place. For although Ulcers that have a corrupted bone lying underneath them may somtimes be cured and covered over with a Cicatrice: yet notwithstanding that soundness is not firm, and of any continuance, but the Ulcer is afterward again renewed; and this happeneth so long as the rotten bone remaineth unhealed.

And yet nevertheless, *Galen* in his first Book of the Composition of Medicaments according to their kinds, Chap. 18. distinguisheth between these *Dysepulote* Ulcers, that is to say, such as are hardly brought to a Cicatrice, and the Ulcers *Cacoethe* or Malignant: and he calleth such of them *Dysepulote*, that arise from the conflux of either many or sharp humors; without this, that the part affected hath already such a disposition, that although that that floweth in should be good, yet notwithstanding it corrupteth it: now those Ulcers that have already gotten this aforesaid disposition, he calleth *Cacoethe*, or malignant. So that al those Ulcers that are hardly cured (from what cause soever it be) may in general be called *Dysepulote* Ulcers; and now in special likewise those that are so made, without any depraved disposition of the part affected. But in regard that al the differences and causes of Ulcers hardly cured have hitherto been explained, there is no need that we add any thing more concerning them.

Malignant ulcers.

And yet nevertheless, there is one cause of those Ulcers that are hardly curable that I have somtimes observed, which I think it not fit here altogether to pass over in silence. It happeneth very often, that in long continued Ulcers the skin is extenuated, and the fleshy panicle and fat is wasted: which if it happen, we may conclude that the Ulcer is not healed, since that the skin can by no means be agglutinated unto the flesh lying underneath it: for when the Capillary Veins tending to the skin are eaten asunder, they cannot then convey unto the skin that blood that is necessary for consolidation.

This

Ulcers Chironia.

This is known, becauſe that the skin is not only by the touch perceived to be extenuated; but the color is likewiſe changed, and becometh wan and dark, and the skin (as it were) withereth away.

There is in this caſe little or nothing to be performed by Medicaments; but the skin is either to be corroded by ſome Cauſtick Medicament; or elſe (as I have ſomtimes cauſed it to be done) the Ulcer is to be opened longwaies with the Iron; and this may very eaſily be done.

As touching the Ulcers *Chironia* and *Telephia*, the Chironian Ulcer hath its name from the Centaure *Chiron*: though ſome there are notwithſtanding that render another reaſon of the ſaid appellation. *Zenodotus* (as *Eraſmus* of *Rotterdam* relateth in Chil. 2. Cent. 8. Prov. 21.) thought that *Chiron* received from *Hercules* a Wound in his Foor, and that the ſaid Wound being altogether incurable, he periſhed thereof; ſo that incurable Ulcers are hence called *Chironian* Ulcers: But *Pliny* in his twenty fifth Book, Chap. 6. and *Ovid* in the fifth Book of his *Faſti*, are of opinion that *Chiron* was not wounded by *Hercules* (who was his friend) but that *Chiron* being entertained by *Hercules*, *Chiron* his Arrow fel accidentally upon the Foot of *Hercules*, and cauſed therein a moſt dangerous and envenomed Wound; and that *Chiron* himſelf healed this Wound with Centaury, which Plant was therefore by thoſe that came after called *Chironium*; and that this *Chiron* was the firſt Inventor of the ancient Chirurgery, being a part of Phyſick; and that from Hands, and the operation of thoſe hands it received its name. So that any contumacious and malignant Ulcer, that by reaſon of its contumacy hath need of ſome *Chiron* to cure it, and which was at the firſt cured by the ſaid *Chiron*, may be called a *Chironian* Ulcer.

Celſus in his ſixth Book, and Chap. 28. defineth a *Chironium* Ulcer in this manner: *It is* (ſaith he) *great, and hath lips that are hard, callous, and ſwelling. The Sanies that iſſueth out of it is not much, but thin; there is no unſavory and ſtinking ſmel, neither in the Ulcer, nor in its Tumor. There is no Inflammation, the pain is but little and moderate; nothing creepeth therein; and therefore it bringeth along with it no great danger; yet however it is not eaſily cured. There is ſomtimes a thin Cicatrice brought all over it, but this is again ſoon broken, and the Ulcer renewed. It happeneth moſt eſpecially in the Feet, and in the Thighs.*

The ſame *Celſus*, ſeeing that he maketh no mention of *Telephian* Ulcers, it is not to be doubted but that he thought them to be the ſame with the *Chironia*: as likewiſe *Paulus Æginetæ* doth when in his fourth Book, and 26. Chap. he thus writeth: *Inveterate Ulcers* (ſaith he) *and ſuch as hardly admit of a Cicatrice, ſome cal them Chironia, as though they needed a* Chiron *himſelf to heal them; others there are that cal them* Telephia, *becauſe that* Telephus *continued long troubled with ſuch a like Ulcer.* Thoſe that think that both the *Chironium* and the *Telephium* Ulcers conſiſt not ſo much in their corroſion as in this, that they are both of them malignant and contumacious, ſo that they are wont to continue with the ſick perſons even unto their old age, theſe diſſent from *Galen*, who (in the ſecond Book of the Method of Healing, Chap. 2. and 14. of the ſaid Method. Chap. 17.) thinketh that *Phagedæna* conſiſteth in eroſion; and that *Chironium* and *Telephium* are a ſpecies hereof. Where we muſt know (as *Galen* acquaints us in his Commentary upon the ſixth of the Aphoriſms, Aphor. 45.) that al Ulcers that become greater and worſe, the Ancients called al theſe Ulcers *Phagedænæ*; and if in this manner we take *Phagedæna*, then *Chironia* and *Telephia* may be called a Species or kind of *Phagedæna*. But there are ſome certain of the latter Writers that have endeavored to diſtinguiſh them, giving unto each of them a proper and peculiar appellation; and ſome of theſe they cal *Chironia*, others of them they term *Telephia*, and a third ſort *Phagedænæ*. So that *Phagedæna* being taken for a corroding Ulcer, is one while the *Genus* of *Chironium* and *Telephium* Ulcers; and another while a certain determinate Species of a corroding Ulcer, differing from *Chironium* and *Telephium*; which (to wit) beſides the skin, eateth through the fleſh it ſelf; and yet nevertheleſs is not altogether ſo malignant as *Chironium*, or *Telephium*, or the *Cancer*.

To wit, *Telephian* Ulcers are the ſame with *Chironia*, ſo called from *Telephus*, who was a long time afflicted with ſuch an ulcer. And what *Galen* (in the fourth Book of the Compoſition of Medicaments according to their kinds, Chap. 4.) hath written touching *Chironia*, to wit, *They cal* (ſaith he) *thoſe* Chironian *Ulcers that are not meanly and indifferently malignant or contumacious, but ſuch as are ſo in the higheſt degree*; The ſame is likewiſe to be taken and underſtood of the ulcers *Telephia*.

The Cauſes.

Now ſuch like Ulcers have their original from a Melancholy humor, having ſome (though not much) black Choler mingled together with it.

Signs Diagnoſtick.

Such like Ulcers are known, in that they have their lips il colored, and for the moſt part they are red, and itching; and although the Ulcer be never ſo lightly and gently handled or wiped, yet there is a pain perceived; the parts lying round about it ſwel up, and the Ulcer is from day to day dilated; and not only the skin, but the fleſh likewiſe that lieth under it is eaten through.

Progno-

Prognosticks.

Every sort of these Ulcers is Contumacious, and hard to be cured, as we told you before.

The Cure.

As touching the Cure, Universals being premised, and the body emptied of the vitious humor, and a fit course of Diet prescribed, there are to be applied unto the Ulcer Medicaments that are compounded of such things as are cold and dry, astringent, and withall Discussive: and such are Plantane, Nightshade, the tops of the Black-berry or Dog-berry bush, the Flowers of Roses, Cypress Nuts, Pomegranate flowers and rinds, Mastick, the bark of Frankincense, burnt Lead, Litharge, and the like.

And therefore in the first place, let the Ulcer be washed and fomented with this or the like Decoction.

Take *Plantane one handful, Flowers of red Roses, Pomegranate flowers, and Cypress Nuts, of each half an ounce; Myrtle berries, Pomegranate rinds, Sumach, of each three drams; Alum burnt half an ounce; boyl them in Water and wash the Ulcer wel therewith.* Or,

Take *the Juyce of the Bramble, Plantane, Nightshade, Shepherds-staff, of each four ounces; the whites of six Eggs, Alum four ounces; destil them in a Leaden Alembick:* Let the Ulcer be washed and fomented with this Water: and let the parts likewise that lie neer unto it be anoynted over with some Defensive.

After the Ulcer is thus washed, let the Unguent Diapompholyx be laid thereon; as also the white Camphorate Unguent, and the Unguent *de Minio.* Or,

Take *Tutty prepared half an ounce, burnt Lead, Ceruss washed, of each an ounce; let them be wel mingled together in a Leaden Mortar, pouring in unto them by little and little the Juyce or water of Plantane, and make hereof a Mass: afterwards add of Bolearmenick three drams; Oyl of Roses and Wax of each as much as will suffice, and make an Unguent.*

More of these like Medicaments shal be declared in the Chapter following.

Chap. 15. *Of the Ulcer* Phagedæna.

Phagedæna what it is. AND because (as we have told you) there is likewise mention made of *Phagedæna* among the Ulcers; we shal therefore here in this Chapter explain it, and shew you what it is. It is so called from the Greek word *Phagein*, from its *Eating*; and this (whether Tumor or Ulcer) hath received its name from eating through and corroding, because it eateth through the parts lying neer unto it. And indeed it is properly an Ulcer. But yet nevertheless, in regard that the Lips of the Ulcer strutting forth with black Choler are lifted up into a Tumor, it is therefore by some referred unto Tumors; and there is mention hereof made by *Galen* in his Book of Tumors, Chap. 14. But we wil treat here of it among Ulcers. But yet nevertheless, as touching its name, this is to be noted, that it is not alwaies taken in one and the same signification. For somtimes (as *Galen* tels us, in Epidem. 6. Comment. 3. Text 37.) *Phagedæna* signifieth an appetite unto, and eating of much meat, and hence (by the Author of the Medicinal Definitions) it is defined to be, a Constitution in which Persons having an appetite unto much Food, and devouring much thereof are not able to retein and keep it; but when they have cast it up, they again desire more; and in this manner it is also defined by *Aurelianus*, in the third Book of his Chronic. Chap. 3. So that *Phagedæna* being taken in this manner, and in this sence, is nothing else but that we cal the Dog-like appetite. And therefore *Pliny*, in his Book 20. Chap. 5. 13. and in his Book 30. Chap. 9. and Book 35. Chap. 13.) for distinction sake (when he speaketh of an Ulcer) is wont to add the name of Ulcers, and to cal them *Phagedænæ* of the Ulcers. And furthermore the name of a *Phagedæna* doth sometimes signifie a certain kind of destruction that befalleth unto Bees; of which *Columella* writeth in his tenth Book, and Chap. 13. But here in this place we take *Phagedæna* as it is only an Ulcer; touching which *Galen* in his Book of Tumors, and Chap. 14. thus writeth; *Whatsoever of the Ulcers there be that eat and devour, and reach unto the Bodies lying round about them, and continually eating through that that is sound, all these Ulcers are by the Greeks called* Phagedænica: *but those that are compounded of both (to wit, of an Ulcer, and a Tumor, surrounding the flesh) these are called Phagedænæ.* Thus *Galen.* Moreover also *Herpes* feedeth upon, and eateth up the parts lying neer round about; but the exulceration is in the Skin alone: but the *Phagedæna* (together with the Skin) reacheth even unto those parts that lie underneath.

Nome. *Nome* is likewise a different Affect, so called from the Greek word, signifying to *feed*; because that it is wont to move forward (stil feeding the Disease) from the sick and unsound parts unto those that are whole and sound, and of these sound particles it is wont alwaies to add somthing thereof unto the unsound; so that it hath its Appellation not from the substance of the thing declared and shewn; but from something that is Accessary, which is to feed; as *Galen* tels us in his fifth Book of the Method of Healing, Chap. 4. For *Nome* signifieth an eating or devouring putridness, albeit that the Ulcer creep but slowly. But *Phagedæna* is from humors that are sharp and corroding, even without any putridness.

But

What Phagedæna is.

But what a *Phagedæna* is, we are now to declare unto you. Now a *Phagedæna* in ſpecial, and properly ſo called, is an Ulcer that feedeth upon and eateth through the fleſh lying underneath it, and thoſe things that are about it; and then preying upon ſomewhat belonging unto the ſound parts, which it addeth unto thoſe that are diſeaſed and unſound; as we may ſee from the ſixth Book of the Aphor. Aphor. 46, and in *Galen* his Book of Tumors, Chap. 12. To wit, the *Phagedæna* which the more ignorant Phyſitians call the Ambulative or walking Ulcer, is an Ulcer that is tumid and profound, eating through the parts lying neer, and the fleſh that lieth underneath.

Its difference from Nome.

For it hath a Tumor about its lips, by which it is diſtinguiſhed from *Nome*, which likewiſe eateth thorow the adjacent parts, but then it is without any Tumor. Although that it be likewiſe otherwiſe diſtinguiſhed from *Nome*, becauſe that in *Phagedæna* the Corroſion is only from a Malignant quality, and the acrimony of the humor; wheras in *Nome* there is likewiſe a putridneſs conjoyned. And it is alſo a deep and profound Ulcer, and ſuch as doth not only eat through the Skin, but even through the fleſh alſo; in which reſpect it differeth from the *Herpes*, that corrodeth and eateth through the Skin only.

The Cauſes.

This Malady hath its original from an aduſt or burnt humor, and Cholerick, and ſuch as almoſt degenerateth into the Nature of black Choler or Melancholly; or elſe from yellow Choler with ſalt Flegm, and a ſerous or wheyiſh humor therewithall mingled: which humor is not ſo thin as that that cauſeth the *Herpes*; nor yet ſo thick as that which produceth the *Cancer*. But now theſe humors proceed, either from ſome principal Member affected with a hot and dry Diſtemper; or elſe they are burnt in the very part that is affected, that lieth under ſome hot and dry preternatural Diſtemper.

Signs Diagnoſtick.

The Signs are already declared and explained; and they may be collected out of this, and the foregoing Chapter.

Prognoſticks.

1. Theſe Ulcers are hard to cure; whereupon they are likewiſe in the general called *Cacoethe*.

2. Yet nowithſtanding ſome are more malignant then others: for which cauſe there is a neceſſity that we have in a readineſs divers Medicaments, differing in ſtrength and virtue. For we never yet heard of any one that with one only Medicament eaſily cured al ſuch like Ulcers as theſe.

3. Eating Ulcers, with a hot and dry diſtemper of the Liver, or elſe conjoyned with the foul Diſeaſe (which we commonly cal the French Pox, or the Neapolitane Diſeaſe) are not to be cured without much difficulty.

4. Eating and devouring Ulcers unleſs they be rightly and ſpeedily healed, they often degenerate into an exulcerated *Cancer*.

The Cure.

About the Cure of this Ulcer it is to be noted (as elſewhere likewiſe we have often ſaid) that in it nothing wil any whit profit or avail (as it is alſo in other Diſeaſes) whileſt that the Cauſe ſtil remaineth. And therefore in the firſt place, ſuch a Courſe of Diet is to be preſcribed that will not only not generate ſuch like aduſt humors, but likewiſe qualifie and correct their acrimony: and afterwards theſe bad humors are to be evacuated out of the body.

And moreover this alſo is to be obſerved, which *Galen* likewiſe taketh notice of (in the place betore alleadged, *Viz.* in the fourth Chapter of his Book of the Compoſit. of Medicam. according to the kinds of them; upon the Medicament of *Aſclepiades*) where he hath theſe words; *Rightly* (ſaith he) *hath* Aſclepiades *added theſe words unto the end of his preſcribed Medicament*; Viz. *and looſen this every third day, and mitigate the pain with fomentations; and ſoften the ſame Emplaſter when you have waſhed it, and again lay it on: for unleſs the Medicament ſhal ſtick ſomwhat long unto the Skin, it effecteth but little or nothing: which moſt Phyſitians are ignorant of, who think that if thrice a day they wipe away the* Sanies *from the Ulcer, they then do better then thoſe that do it but twice a day.* And the truth is, there is moſt commonly a great error committed in this very point; whileſt moſt men think that they take the beſt courſe with the Patient, if they waſh ſuch a like Ulcer three or four times a day. But ſince that the Medicament doth not at all act any thing unleſs by the Native heat it be drawn forth into act, and in regard that in malignant and long continued Ulcers the heat of the affected part is very weak, it needeth much time therefore to excite and draw forth the ſtrength and virtue of the Medicament. Wherefore the ſame Medicament ought to be kept ſticking upon the part affected a long while; neither is its action to be diſturbed, when the virtue and ſtrength thereof is ſcarcely yet drawn forth by the heat of the place affected (ſo that it now but beginneth to act) and a new Medicament to be applied. In which caſe notwithſtanding the condition of the humor exciting the Ulcer is to be conſidered. For if it be very ſharp, it is the oftner to be wiped away, leſt that ſticking in the ulcerated part it more corrupt the ſame.

CHAP.

Chap. 16. *Of an Ulcer with pain.*

BUt now the Causes do not only cherish and encrease the Ulcers, and there are likewise certain Diseases therewith joyned to accompany them, but there happeneth likewise oftentimes a pain unto these Ulcers, which is therefore immediately to be mitigated; in regard that pain attracteth, augmenteth the Ulcer, and causeth Inflammations and the *Erysipelas* to arise. Now as touching pain in general, we have already spoken in the first Book of our Practice, Part 3. Sect. 1. Chap. 2. So that we are here only to treat of the pain of Ulcers. This pain therefore in ulcers ariseth for the most part from a sharp and corroding humor. But now whereas the pain is to be taken away, either by taking away the cause, or properly by mitigating the pain, or by taking away the sense thereof (as we have shewn you in the fifth Book of our Institutions, Part 2. Sect. 3. Chap. 8. and likewise in the place alleadged) the last of these waies is not so safe, because that it cannot be administred without great detriment unto the part; and therefore it is not to be put in practice but only in case of urgent necessity. For this reason it is most safe to take away the cause of the pain; or if this cannot be done but in a long time, and that there be cause to fear that in the mean time the Ulcer may be encreased and made worse, then in this case Anodynes are to be made use of: which what they be, we have shewn in the place alleadged. Those things that here much benefit, are, the Yelks of Eggs, Saffron, Turpentine, Oyl of Roses, Rosin of the Fir-tree, out of which mingled together Liniments may be made, to be imposed upon the ulcer. But upon the Compass or Circuit of the ulcer, the Fat of a Hen, of a Goose, of a Duck, the Mucilage of Linseed, of Fenugreek, of Marsh-mallows, the Oyl of sweet Almonds, of Camomile, of Dil, and of Violets, are to be imposed. Or,

Take *Mallows, Marsh-mallows, of each one handful; boyl them to a softness, and then bruise them wel; when they are bruised and passed through a hair sieve, add of Barley meal one ounce; Linseed and Fenugreek, of each one ounce; Oyl of Roses two ounces; Oyl of Camomile and white Lillies, of each one ounce; the Mucilage of Marsh-mallow seeds, the extracted Water of the Elder flowers an ounce and half; Saffron one scruple; the Yelks of two Eggs: Make a Cataplasm.* Or,

Take *Crumbs of white Bread two ounces; soften them in Milk; and then add of Barley Meal, and Linseed, of each one ounce; the pouder of Camomile flowers half an ounce; Oyl of Roses an ounce and half; Water-lilly half an ounce; the Yelk of one Egg, Saffron one scruple: mingle them and make a Cataplasm.*

But if at any time we have a mind to fit the Medicaments unto the cause, in regard that most commonly in ulcers the pain ariseth from hot and sharp humors; therefore to take away this pain we may administer the juyce or the destilled water of Nightshade, Plantane, Henbane, Sengreen, Oyl of Roses, Whites of Eggs, with Rose water: of this those Cataplasms that are made of Mallows, Plantane, Nightshade, and Oyl of Roses, are to be laid on; or else an Unguent of the white of an Egg, Oyl of Roses, and Litharge, wel bruised and mingled together in a Leaden Mortar, and afterwards boyled with the Juyce of Sengreen, until al the juyce be consumed; or a whol Egg carefully mingled together with the Oyl of Roses, and Turpentine, in a Leaden Mortar; or else the white Camphorate Unguent.

If necessity drive us unto Narcoticks, then the Oyl of Poppy, of Henbane, of Mandrake, of Frogs, or the juyce of Henbane, al or any of these may be applied with Milk.

Chap. 17. *Of the Ulcers of the Legs, and other particular Ulcers.*

AND these things we thought fit (in a compendious way) to speak of Ulcers in the general; which any one may easily apply unto the ulcers of particular parts. Neither do we conceive it to be at al needful, that we should speak any thing more of the ulcers of al the particular parts, since that we have already treated of them in our former Books, as we shal by and by tel you. And therefore in this Chapter we wil speak only of the ulcers of the Legs in special. For it oftentimes happeneth that bad and depraved Humors, especially the Melancholly, as wel by their own weight tending unto the Thighs, as by nature thrust and driven down thither (as unto the external parts) do excite ulcers; and this especially happeneth after *Erysipelas's* that very frequently infest the skin; and chiefly in Women, where without doubt there is a concurrence of somthing amiss in the Womb: and I know that in some certain Families such ulcers are so familiar, that al the Women therein (although they seem to be otherwise very wel) have of these long continued ulcers in their Thighs. And therefore by al means possible we are timely to meet with, and prevent these ulcers. For unless they be speedily healed, Nature wil accustom her self to send away al the vitious humors that are bred and heaped up in the whol body unto these parts, which afterwards, if the ulcer be closed up, and the body be not diligently and often purged, wil excite other more grievous Diseases, especially in those that are aged: for if they be neglected, they are wont likewise to gain growth and encrease, to corrupt the parts that lie neer, and to become callous; so that if some speedy

The ulcers of the Legs.

dy course be not taken for the healing of them, they afterwards become altogether incurable.

Now that these ulcers may be rightly cured, first of al the body is to be throughly purged from the vitious humor; and the fault of the Spleen (which for the most part is here present) is to be corrected, and a Purgation oftentimes to be repeated.

And afterward the Unguent Diapompholyx is to be imposed (which I have ever found to be most efficacious in this kind of ulcer) so long as until there appear a *Pus* good and white: and then this Emplaster:

Take *of the Unguent Diapompholyx, the Emplaster Diapalma, the Emplaster Gryseum, of each one ounce; Gum Elemi two drams; Sugar of Saturn one scruple: mingle them wel in a Leaden Mortar.*

With which two Medicaments I have oftentimes happily and successfully cured the long continued ulcers of the Thighs. Or,

Take *Cerus two ounces, Litharge one ounce, Oyl of Roses one pint, Wax two ounces; let them be carefully mingled in a Leaden Mortar: afterwards add of Tutty prepared with the Water of Nightshade, of Frankincense, and Lead burnt, of each one ounce; and let them be again stirred about in the Mortar, and then make an Unguent.* Or,

Take *Wax, Rosin, of each one ounce; the Suet of a gelt Pig two ounces; Ship Pitch, Oyl, of each three ounces; Mastick, Frankincense, and Myrrh, of each three drams; Litharge one ounce and half, Cerus half an ounce. Let the Oyl, Rosin, Wax, and Suet, melt together, and then let them be boyled unto a just consistence: and after let the rest of the Ingredients be added.* Or,

Take *White Wax, Turpentine, Rosin, of each one ounce; Frankincense, and Mastick, of each two drams; Styrax Calamite three drams; Gum Elemi six drams; round Aristolochy two drams; the juyce of Milfoyl, and Betony, of each half an ounce; Oyl of Roses as much as wil suffice, and make an Unguent.*

But let the Wax, Rosin, Turpentime, and Oyls, be first of al dissolved together; after this let the Juyces be poured unto them; and when they begin to grow cool, add the Pouders. Or,

Take *Oyl of Roses twelve ounces; Cerus three ounces; Litharge four ounces and half; Frankincense, and Mastick, of each half a dram; Dragons blood half an ounce; Myrrh, and Sarcocol, of each two drams: boyl them a little, until they be red; after remove them from the fire, and then dip therein an old Linen cloth; which when it is throughly soaked in the matter of the Emplaster may be taken forth and spread abroad to make a Sparadrape.*

Touching the ulcers of the rest of the parts, we have already treated of them in the former Books of this our Practice. To wit, in the first Book, Part 3. Sect. 2. Chap. 18. of the ulcers of the *Adnata* and *Cornea* Tunicles of the Eye: *ibid.* Sect. 3. Chap. 3. of the ulcers of the Ears: *ibid.* Sect. 4. Chap. 1. of the ulcers of the Nostrils: In the second Book, part 1. Chap. 3. of the ulcers of the Lips: *ibid.* Chap. 16. of the ulcers of the Gums: *ibid.* Chap. 21. of the exulceration of the Throat-pipe: *ibid.* Chap. 22. of the ulcers of the Tonsils: Part 2. Chap. 1. of the ulcers of the *Aspera Arteria* or rough Artery: *ibid.* Chap. 12. of the ulcers of the Lungs: *ibid.* Chap. 18. of the Fistula's of the Thorax: Part 4. Chap. 3. of the ulcers of the Heart: Book 3. Part. 1. Sect. 1. Chap. 1. of the ulcers of the *Oesophagus*: *ibid.* Chap. 17. of the ulcers of the Stomach: Part 2. Sect. 1. Chap. 9, & 10. of the ulcers of the Intestines: Part 3. Chap. 5. of the impostumes and ulcers of the Mesentery: *ibid.* Chap. 7. of the ulcers of the Pancreas: *ibid.* Chap. 8. of the Caul: Part 4. Chap. 8. of the Spleen: *ibid.* Part 6. Chap. 8. of the Liver: Part 7. Chap. 11. of the Reins: Part 9. Sect. 1. Chap. 6. of the Bladder: *ibid.* Chap. 9. of the Urinary Passage: Part 8. Chap. 5. of the Testicles: *ibid.* Chap. 6. of the Cods: *ibid.* Chap. 8. & 10. of the Yard: Part 10. Chap. 5. of the Navel: *ibid.* Chap. 7. 11. of the Abdomen: Book 4. Part 1. Sect. 1. Chap. 48. of the Neck of the Womb: *ibid.* Chap. 10. of the Fistula's of the Neck of the Womb: *ibid.* Chap. 11. of the Cancer of the Womb: *ibid.* Chap. 12. of the Gangrene and Sphacelus of the Womb: Sect. 2. Chap. 14. of the Cancer of the Womb: *ibid.* Chap. 19. of the ulcers of the Womb: *ibid.* Chap. 20. of the Testicles in Women: Part 3. Sect. 1. Chap. 7. of the Cancer of the Breasts: Chap. 8. of the ulcers and Fistula's of the Breasts: *ibid.* Chap. 11. of the ulcers of the Teats.

Chap. 18. *Of Burnings.*

WE may not unfitly unto Ulcers subjoyn Burnings, which do likewise excite and raise ulcers. For oftentimes it happeneth, that by some mischance and unfortunate accident the Members may be scalded, either with water, or with hot boyling Oyl, or melted Metal; or else one may chance to fal into the Fire, into the Water, or into scalding hot Oyl; which whensoever it happeneth, then pain, blisters, and exulcerations are excited.

The Differences.

Now of such things as are burnt there are three degrees or Differences. For somtimes there is only a heat and pain excited in the part affected by the said burning; and unless that Remedies be forthwith administred, the Scarf-Skin wil be separated

parated from the true Skin, and blisters wil be raised, in the which there wil be a certain cleer water contained: and oftentimes likewise suddenly and in a moment the blister or bladder is lifted up, and the very Skin it self is burnt, dried up, scorched, and contracted together; and yet notwithstanding, there is al this while no Crust or Eschar produced: but at other times the very Skin it self, yea and oftentimes the flesh that lieth under it is burnt, dried up, and an Eschar produced, and the Skin becometh black, loseth somwhat of its sense and feeling; and after that the Eschar is fallen off there is left behind an ulcer sufficiently deep. For fire dissolveth the continuity, and exciteth a pain: and because the moist parts in the Skin are resolved by the force of the fire, and endeavor to exspire and breathe forth, but are stil kept in by the thickness of the Scarf-skin, they lift it up, and raise the bladder or blister. But somtimes again there is by the force of the fire some kind of humidity left remaining in the part, from whence the Skin is contracted and drawn together: but somtimes also the moisture of the part is altogether dissipated and dried up, and an Eschar is produced: and this happeneth according to the variety of the things that burn. For Water burneth less than the other; and this Water likewise more or less, according as it is more or less hot. For stubble, straw, flax, and the like, cause no great and vehement burning, unless the burning be long continued. But Oyl burneth more, and so do Fats, Varnish, Pitch, Honey, Wax. And the greatest and most vehement of al burners, are Lead and Tin melted, Iron and other Metals made red hot by the fire, as likewise the very actual Fire it self, Gun-powder, and Lightening. And so likewise by how much the thicker the subject matter of the Fire is, and the more its force and strength is augmented by the concurrence of its many Atomes, and the more it is condensed; and lastly, by how much the longer the action of the Fire is continued, by so much the greater the burning must needs be. But if the fire be in a subject more thin, and so its Atomes be the more dispersed, and but little united, and if its action likewise continue but a short time, then the burning is so much the less.

Prognosticks.

Touching the Diagnostick Signs there is no need that we speak any thing at al; since that the burning wil sufficiently manifest it self. Its Degrees likewise, and how far it hath gone, wil sufficiently appear by what was said a little before.

As for the Prognosticks: 1. By how much the lighter the Burning is, by so much the more easily it is cured, and so much the less is the evil that it bringeth along with it: but by how much the burning is greater, by so much the harder it is to cure, and so much the more grievous the evils that it bringeth along with it. For oftentimes an Inflammation of the part, yea even a *Necrosis* or Mortification (the Radical humidity being consumed, and the Native heat dissipated) ariseth from thence, ulcers hard to cure are likewise from thence excited, the motion of the part is abolished, and there are filthy and deformed Cicatrices left remaining.

2. Burning by Lightening is likewise very dangerous, and for the most part deadly.

3. By how much the purer the Body is, by so much the more easily is the burning cured. But if the Body be either Plethorick, or Cacochymical, then from the pain and heat there is very easily caused an afflux of the humors; and from thence Inflammations, putrid ulcers, and other evils are excited.

4. The Burning is likewise somtimes more, and somtimes less dangerous, according to the Nature and condition of the parts affected. For if there be but only one part burnt, there is then less danger than if many parts, or the whol body be burnt. For when many parts, or the whol body be burnt, it is very rare that the persons thus burnt should ever be perfectly wel and sound; but most commonly they die miserably by the very vehemency of the Symptoms.

5. If the burning be so deep that it reach even unto the greater Veins, Arteries, and Nerves, it is then dangerous. For when the exsiccated Vessels are contracted and shut up, the blood and the spirit cannot then flow unto the affected part; from whence there is caused an Atrophy; a Gangrene, and a deprivation of sense and motion.

6. The burnings of the Abdomen are not cured without much difficulty: for the Skin is there softer; and those Muscles by reason of their various motions are variously extended and contracted.

7. If the burning reach even unto the Intestines, it is then deadly.

8. The burning likewise of the Groyns is very dangerous, since that those places are moist, and therefore the more fit to receive the afflux of humors.

9. The burnings of the Eyes are also dangerous. For although they be but light; yet notwithstanding they may produce either a stark blindness, or a deprivation of the sight, or at least a diminution thereof.

10. If the hairy parts be ever a whit grievously burnt, they alwaies continue smooth and slick: for hairs are never generated in that hard Cicatrice that is brought over the affected part.

The Cure.

Indeed some there are that from the ordinary and wel known Axiom of Physitians (viz. That Contraries are the Remedies of Contraries) are of opinion, that such Members as are burnt ought so be cooled; and therefore they think that unto those

thoſe parts that are burnt there muſt Coolers be immediately applied. But this their opinion hath its original from that vulgar but falſe Conceit, viz. That the burning is only an alteration, and the introducing of a hot quality; whenas notwithſtanding the very fire it ſelf, and likewiſe its Atomes, are communicated unto the part that is burnt, and an *Empyreuma* (as al of them are forced to confeſs) is produced: for what, indeed, elſe is this *Empyreuma* (which al of them tel us ought to be called forth) then the ſmal parts or particles of the very fire, that have penetrated themſelves into the burnt part: and Experience it ſelf teacheth us, That cold things wil not cure burnings; but that (on the contrary) by the ſaid Coolers (the fiery particles being thereby thruſt down much lower) the pain is wonderfully augmented, and inflammations, yea and the Gangrene it ſelf, and the Sphacelus excited: but that ſuch things as are hot, and that cal forth the *Empyreuma*, are very helpful: from whence likewiſe it is (as we al wel know) that the burnt parts are not to be plunged into cold water, but rather to be put ſomwhat neer unto the fire. Which although that *Platerus* ſeem to find fault therewith, yet uſe hath taught even the very vulgar the truth of this; and *Ariſtotle* long ſince took notice hereof, as appeareth in his Sect. 2. Problem. 56. Neither are thoſe things that are applied hot, applied in the nature of Anodynes, ſince that al Anodynes wil not do it, as by and by in the Cure it wil appear: but only thoſe of them which have virtue and power in them of calling forth the *Empyreuma*. But now ſimilitude and likeneſs begetteth attraction; and the external fire calleth forth the intrinſecal fire, that is to ſay, that very fire that it ſelf conveyed into the burnt part; as *Ambroſe Parry* tels us very truly, in his Book 11. Chap. 9.

In the Cure therefore of Burnings, let the firſt care be to cal forth the *Empyreuma*: to wit, in the ſame manner, like as we have told you in Part 1. Chap. 15. touching Kibes, that the cooled parts are not rightly cured if they be put neer unto the fire, or plunged into hot water; ſince that hence the pain becometh ſo much the more intenſe and vehement; yea and that oftentimes a Gangrene and Sphacelus are excited; but if they be firſt rubbed with Snow, or dipt into cold water, then the cold is drawn forth: ſo if the *Empyreuma* be called forth by thoſe things that are hot (which is done by means of the ſimilitude or likeneſs) then this Malady is ſoon taken away. Which that it may be rightly done, the Cure is to be inſtituted and ordered according to the degrees of the Burning above propounded.

The Cure of a light burning.

Firſt of al therefore, if the Burning be but light, we muſt prevent what we can the breeding and ariſing of Puſtules or bliſters: for if this be done, the ſick perſon is then already freed from al the evil of the burning. But now this is to be ſpeedily done; and therefore whatſoever Medicament we have ready at hand, we muſt forthwith make uſe thereof: and therefore the Member (if the nature and condition thereof wil ſo bear it) is to be put a little neer unto the fire, or elſe deeply plunged into hot water; or elſe fomented with a Spunge, or a Linen cloth doubled, and then wel ſoaked in warm water, that ſo the *Empyreuma* by reaſon of the likeneſs may be extracted; or elſe immediately a Linen cloth dyed in Varniſh is to be impoſed upon the burnt Member; or a Linen cloth wel wetted in the Ley or water in which unſlaked Lime hath been extinguiſhed. And then preſently Onions bruiſed in a Mortar with Salt are to be laid upon the burnt part: or elſe this Unguent. Viz.

Take *of a raw Onion one ounce and half; Salt, Venice Sope, of each half an ounce: mingle them in a Mortar, pouring in unto them as much of the Oyl of Roſes as wil ſuffice, and make an Unguent.* Or,

Take *Venice Sope three ounces; raw Onion one ounce; Salt ſix drams; the Oyl of Eggs half an ounce; Oyl of Roſes and ſweet Almonds, of each one ounce and half; the Mucilage of Quince ſeeds one ounce: mingle them, and make an Unguent.* Or,

Take *the green Rind of the Elder tree, or the firſt ſhoots of the Elder; let them be wel bruiſed, and then boyled in Butter that is new and unſalted, and then ſtrain them.* Or,

Take *Unſlaked Lime often waſhed in Roſe-water, and with the Oyl of Roſes make a Liniment.* Or,

Take *Oyl of Lin-ſeed, Oyl of Olives, of each one ounce and half; Salt half an ounce; the Whites of two Eggs: Mingle them, &c.*
Or,

Take *May Butter unſalted, Venice Sope, and Varniſh, of each a like quantity: Mingle them, &c.* Or,

Take *Oyl of Roſes three ounces, Camphire three drams, the Whites of three Eggs, and mingle them.* Or,

Take *the Juyce of Onions three ounces; Oyl of Roſes, freſh Butter, the fat of a Hog, of each one ounce; Lime waſhed in Roſe water half an ounce; the Mucillage of Quince ſeeds extracted with Roſe-water one ounce; a little Turpentine, and make a Liniment.* Or,

Take *the middle Rind of green Elder one ounce and half; the juyce of the firſt ſhoots of Elder one ounce; Oyl of Linſeed and Roſes, of each ſix drams; Varniſh, and Hogs Fat, of each one ounce; Wax, one ounce and half; Frankincenſe pulverized one ounce; boyl them a little while in Water; and when they be cooled, gather the fat together, and make uſe thereof inſtead of an Unguent.*

Of Lime often (even twelve times) washed, and the former water alwaies thrown away, there may be made many Unguents very good against Burnings: for either it is mingled with fresh Butter, or Oyl of Roses, or Oyl of St. Johns wort: and sometimes there are other things added, as the Mucilage of Quince Seeds, of Fleawort, the white of an Egg, and white Wax. These things are likewise very good.

Take *the Juyce of the middle rind of the Elder one ounce and half, Cream of Milk one pint; boyl them to a Just consistence; and then add of the Mucilage of Quince Seeds, the extracted water of Nightshade, unsalted Butter, and Ceruss, of each half an ounce, mingle them, and make an Unguent.* Or,

Take *Oyl of Linseed four ounces, new Wax two ounces, whites of Eggs as much as wil suffice; mingle them over the fire, and make an Unguent.*

For the healing of all kind of Burnings, this is likewise very prevalent.

Take *Oyl Olive one part, whites of Eggs two parts; let them be shaken together with all exactness and care, and throughly mingled together, that so a white Unguent may be made thereof*; with the which the burnt place is oftentimes every day to be anoynted with a Capons Feather, even until the Crust shal fal off of its own accord; neither is there here any External ligature to be made use of.

Ambrose Parry (in his *Parisian Nosocomium*) writeth, that this following hath been made use of with very good success:

Take *Lard small shred one pound, let it melt in Rose water, and then let it be strained through a thin Linen Cloth: let it be washed four times in Plantane water, or some other convenient water: and afterward add the Yelks of three new-laid Eggs, and so make an Unguent.* Or,

Take *Crawfish as many as you please: bruise them to pieces alive in a Mortar; and afterwards take new fresh Butter, make it boyling hot and then scum it: whilest it is yet hot, cast in the mashed Crawfish and boyl them until they wax a little red; afterward strain it, and let this Unguent be kept for use, for it is singularly good.*

Omnibonus Ferrarius in his fourth Book of the Art of Curing Infants, and Chap. 25. commendeth this that followeth as a rare secret, and such as he himself had oftentimes made tiral of with very good and happy success, although the Pustules were already raised. *Viz.*

Take *the whites of two Eggs, Oyl of Roses two ounces, Rose water one ounce, Mingle them together exactly.*

Afterwards let a white linen Cloth, or silk (that is very thin woven) being first throughly wet and soaked in that Liniment be laid upon the burnt part, and not at all taken off untill the Malady be healed; but only let the Linen Cloth be again anoynted over and wel wet with the said Liniment, twice or thrice every day. After the fourth day is past, in the place of the Whites of Eggs take the Yelks of the same; and continue the use hereof untill there be seen to appear the breeding of a new Scarf-skin: and then with a pair of Cizers let the little Cloth be from day to day cut off by some and some, where it shall appear that this new Scarf-skin is generated, until at length the whole Cloth be cut away; which when it is wholly taken away, there will appear no sign or mark at all of any hurt or burning. Or,

Take *the middle rind of the Elder as much as you wil; boyl it in the Oyl of Olives; when it is strained, add of Ceruss two parts, burnt Lead, and Litharge, of each one part; Mingle them exactly in a Leaden Mortar.*

And yet nevertheless this is to be observed touching al Unguents, that they ought to be so ordered, that they may not stick over stifly and too close unto the part, but so that they may easily be cleansed and removed. Neither indeed wil these kind of Ulcers admit of a strong and exact cleansing; but they must only be wiped clean by putting a fine thin and soft Linen Cloth upon the part, and so cleansing it from its filth and purulency. But if the Unguents stick too close, they then cause much pain unto the Party, and much trouble to the Physitian in his cleansing away of the filth and impurities.

If the Blisters or Pustules be elevated, and yet notwithstanding the Malady never a whit more grievous than before, they are not then immediately to be opened: for if they be presently opened, by reason of the Skins being made naked and bare, there wil a pain be excited, and the Cure wil be the longer ere it be wrought. But at length on the third day, when the new Scarf-skin beginneth to be formed and bred, then they are to be opened: but this opening must not be long in doing, lest that the humor within conteined be made the sharper, and so it corrode and eat through the Skin.

Burning by Gun-powder

Unto this first degree there belongeth (for the most part, for if there be greater store of the Gun-powder, the hurt wil be so much the more vehement) that burning that happeneth by means of Gun-powder; which oftentimes hath this peculiar unto it, that some Corns of the said Powder wil remain and stick fast in the Skin of the Face, and there cause a great deformity. Which if it so chance (for otherwise if the part be only hurt by the flame of the said Powder, and that there be no Corns thereof driven into and fixed in the Skin, it is then to be healed and cured like as other Burnings) forthwith the Corns of Powder are to be drawn forth with a Needle, or some other Instrument fit for the purpose: but if they cannot be al of them presently drawn forth; we must then permit

permit the Pustules to be lift up; for so by this means some of these grains of Powder may be the more easily drawn forth. But if the Chirurgeon be not presently called at the very beginning, and if after the burning is quite healed there remain still some blemishes, then there is to be laid on a Vesicatory of Cantharides and Leven; and the Bladders or Blisters that are excited are to be cut with a pair of Cizers, the Powder to be taken forth, and the place (the like hereunto is to be done likewise at other times in such like burnings) is carefully to be washed from its blackness with the Decoction of Fenugreek and Camomil flowers. And afterward this or the like Liniment is to be made use of. *Viz.*

Take *Gum Elemi one dram; Dissolve it in the Oyl of Eggs, of Roses, and of white Lilies, of each two drams; Unguent Basilicon three drams; unsalted Butter one ounce; and mingle them.*

Gulielmus Fabricius in his Book of Burnings, Chap. 6. maketh use also of the Powder of Precipitate.

But *Paræus* doth rightly inform us, that this Gun-powder doth sometimes so penetrate into the Skin and the Flesh (these notwithstanding being not greatly hurt) that it cannot by any Remedies be taken or drawn forth, neither by Phænigms, nor by Vesicatories, nor by Scarification, nor by Cupping-glasses, so that oftentimes there remain some certain foocsteps and prints thereof; as experience it self testifieth.

But for the moderating of the pain, let the parts that lie neer be anoynted over with this Unguent.

Take *Oyl of Sweet Almonds, of Roses, of white Wax, of each one ounce; let them melt over the fire; and then ad of Camphyr one scruple, and a little of the Mucilage of Quince seeds; Mingle them, &c.*

Burning from Lightening.

And hither belongs that Burning that happeneth from Lightening. But now in regard that Lightening hath Joyned therewith a Malignant & poysonous quality (which manifestly appeareth from the stinking smel it carrieth along with it, and that great power it hath to hurt the body, yea oftentimes to Kill; as also by this, that even the Dogs wil not touch the flesh or Carkasses of those Creatures that have been destroyed by Lightening:) therefore when any one hath been blasted and burnt with Lightening, then the Party is immediately to be put into a Swear, by giving of him some of the Pouder of Bezoar, or Treacle, or Bezoar Water. The Arteries also, the Lips, the Tongue, and the Nosethrils, are to be anoynted with Wine in the which Treacle hath been dissolved; and unto the Hand-wrists and the Heart there ought to be applied Cordial Epithems: but unto the burnt place there are to be applied Unguents made of Onions, the Leaves of Rew, and Treacle: there are likewise to be administred Cordiall Syrups, Conserves, and Pouders.

If there be an Eschar drawn over it, it is speedily to be removed with a Penknife; and then such a like Unguent as this is to be applied.

Take *of the Pouder of the Root of Swallow-wort, of Angelica, of each half an ounce, the Leaves of Rew, and Water-Germander, of each one dram; Treacle two drams; Treacle Spirit three drams; Honey of Roses two ounces, mingle, &c.*

The Ulcer being cleansed, this sarcotick Pouder is to be strewed thereon for the breeding of flesh.

Take *Roots of Angelica, and Swallow-wort of each one ounce; Myrrh, Mastick, Frankincense, the Leaves of Water Germander, of each half an ounce; Aloes succotrine two drams; make a Pouder, which may be sprinkled with the Juice of the true and right Nicotian or Tobacco and Sanicle; and hereof Trochisques are to be made, which must be dried in the shade, and (when there is occasion) again reduced into a Pouder.*

But then if there be likewise any bones broken, then we are not to make use of those extraordinary and common Astringent Cataplasms (lest that the evaporation of the poyson should be hindered) but some other, of Bean meal, Barly meal, of Lupines, of Angelica root, of Swallow-wort, of Rew leaves, Leaves of Water Germander, and Treacle: and this is to be renewed day by day, untill such time as the strength of the poyson be overcome and discussed. And upon the place there is a Defensive to be put, lest that the poysonous vapours through the vessels ascend up unto the Heart.

The Cure of Burnings of the second degree.

But if the Burning be so great and vehement, that there be not only bladders or Blisters raised, but that the Skin be likewise burnt, overdried, and drawn together, then those Medicaments that only draw forth the *Empyreuma* wil not suffice, neither are they alone to be applied; but such are likewise to be administred that mollifie and soften the Skin that is so much dried. And therefore all the Pustules are forthwith to be cut and opened, that so the hot and sharp humor may flow forth; and then such a like Unguent is presently to be laid on upon the place affected,

Take *of the Basilick Unguent one ounce, Oyl of Roses, of Almonds, of white Lilies, of each three drams; Yelks of two Eggs; Mingle them &c. Or,*

Take *of new fresh Butter, the new and fresh fat of a Hen, of each one ounce; new Wax, and Oyl of white Lilies, of each half an ounce; let them melt upon the fire, and then mingle therwith of Saffron one scruple, Mucilage of Quince seeds one ounce; Mingle them, &c.*

Or

Or else this of *Fabricius*:

Take *New fresh Butter washed in Rose-water three ounces*; *Oyl of Violets, of the Yelks of Egs, of sweet Almonds, of each half an ounce*; *Barley Meal one ounce and half*; *Saffron one scruple*; *Mucilage of Quince seeds one ounce*; *Wax as much as wil suffice, and make an Unguent.* Or else another of those things that were before mentioned. Or,

Take *Litharge, Ceruß or Vermilion, as much as you please*; *let them boyl in Vinegar*; *the Vinegar being passed through the filtring bag, add of the Oyl of Violets, or Oyl of Eggs, a sufficient quantity*; *and let them be carefully mingled together*: And afterward,

Take *the Pulp of sweet Apples rosted under the Embers two ounces*; *Barley Meal, and Fenugreek seed, of each half an ounce*; *and with Milk make a Cataplasm*; *unto which add of Saffron half a scruple*: *mingle, &c.*

But upon the burnt place such a Defensive is to be laid on.

Take *the Pouder of Bole-armenick, Dragons Blood, Pomegranate flowers, Flowers of red Roses, of each half an ounce*; *Oyl of Roses three ounces*; *Wax one ounce and half, a little Vinegar, and make an Unguent.*

And then the Member it self is afterward to be bound about with a Swathband that hath been wel wet in *Oxycrate*, or else a Linen cloth throughly moistened in the said Oxycrate is to be imposed upon it, that both the pain may be mitigated, and the influx of the Humors hindered and prevented. They commonly make use of that tart Brine or pickle in which the Cabbage is kept and preserved.

Cure of Burning of the third degree.

If (lastly) the Skin be not only somwhat dried, but that al the Radical humidity thereof be wholly consumed, and the Native heat altogether scattered; yea and the very flesh it self, and the Veins, and the Arteries, and the Nerves be burnt (so that there be cause to fear that the part may Gangrenate) in the first place, then the Pustules and al the blisters are to be cut, and the water contained in them to be dried up. And then afterward we must do our endeavor that the Eschar may forthwith the first or second day be separated; or if this may not be done, it is then to be cut in divers places with a Pen-knife, that so there may be a passage and way made for the issuing forth of the humor, and the admission of the Medicaments unto the part affected: and therefore instantly the Liniment of *Gulielmus Fabricius* (that is anon to be described) ought to be laid on. Or else,

Take *unsalted Butter washed in Rose-water three ounces*; *the Basilique Unguent one ounce*; *the Mucillage of Quince seeds extracted with Rose-water, Oyl of sweet Almonds, and white Lilies, of each half an ounce*; *the Yelk of one Egg*: *Mingle, &c.* Or,

Take *fresh Butter, Oyl of Roses, Hogs Fat, of each one ounce*; *the Yelks of two Eggs*: *mingle, &c.* Or,

Take *the Mucillage of Quince seeds extracted with the water of Parietary or common Pellitory of the wall two ounces*; *Oyl of white Lilies one ounce*, *the Yelk of one Egg*, *Wax as much as wil suffice to make a soft Unguent.*

But upon the Linen cloth there must be laid on a little of the following Emulsion:

Take *Gourd seed hulled two ounces*; *Quince seed two drams*; *Fenugreek seed one dram*; *pure Water three quarts*; *make an Emulsion*: *adding hereunto of white Venice Sope half an ounce*; *Camphyre half a scruple*: *Mingle them, &c.*

Defensives are not here so fit and convenient, (especially if the part begin already to swel up, and most of al if there be danger of a Gangrene to follow) in regard that they hinder Transpiration.

If there be a Gangrene already begun, then the Cure is to be ordered and ordained, as we shal further shew you in the following Chapter: and if there be any thing that is quite burnt, it is timely to be separated, lest that the putridness corrupt the found parts.

When by the Eschar that which was burnt shal be separated, the ulcer is then to be cleansed, filled with flesh, and closed up with a Cicatrice; as we have hitherunto told you in the Cure of ulcers, and as we shal further shew you in the following Chapter. But yet let not those things that you administer to produce the Cicatrice be over dry, lest the Cicatrice be made foul, unsightly, and rugged.

Gulielmus Fabricius (to cause the Cicatrice in the burnt places) made use of these things following:

Take *Emplast. Palmei two ounces*; *Hens Fat, and Goose Fat, of each half an ounce*; *let them melt together*: *and then mingle therewith of burnt Allum, Calcined Lead, Litharge of Gold, Lapis Calaminaris, of each one dram*: *let them be bruised together in a Leaden Mortar, adding thereto of the Mucillage of Quince seeds, and Fenugreek, of each a sufficient quantity, and make an Unguent.*

He likewise in this case very often made use of the Alabastrine Unguent (and that with singular benefit) of which this is the Description:

Take *of the Alabaster stone calcined one ounce and half*; *of the white Pumice stone calcined half an ounce*; *burnt Allum two drams*; *make of them al a very smal and fine Pouder*: And afterwards,

Take *white Wax, Goats Suet, the Oyl of sweet Almonds, and white Lilies, of each one ounce*; *Oyl of the Yelks of Eggs half an ounce*: *make an Unguent that mollifieth, and asswageth pain, and draweth over the part a fair Cicatrice.*

If

If the Veins, and the Arteries, and the Nerves likewise be burnt (left that the part should be surprised with an Atrophy by reason of the want of Aliment, but that the Vessels that were streightly shut up may be opened) they are to be anointed over with this following Unguent.

Take *the juyce of Earthworms two ounces; Mans Fat, Hens Fat, Bears Fat, of each one ounce; Spirit of Wine two drams: Mingle them, &c.*

If the parts that are naturally severed and disjoyned be burnt, as the Eye-lids, the Lips, the Fingers, (left that they should grow together) dry Liniments, or most thin little plates of Lead are to be put betwixt. And then at length there is likewise a special regard to be had unto the parts affected, in the choyce of the Medicaments. For it wil be altogether unfit and improper to apply unto the burnt face those Medicaments that are made of Onions, liquid Sope, as also Varnish, in regard that the Eyes may hereby be easily hurt. And therefore upon the Face we must lay on the Unguent of *Omnibonus Ferrarius* (before mentioned) or some other of Sope, that is made thicker, that so it may not flow and run abroad. As,

Take *Oyl of Roses, and of sweet Almonds, of each half an ounce; Venice Sope one ounce: Mingle them, &c.*

The burning of the Eyes. If the Eyes be hurt, then let there instantly be dropped into them Womans Breast-milk, or any other Milk blood warm: Or let such a like Collyrie be administred:

Take *Rose-water three ounces; Plantane Water one ounce; of Quince seeds, and Fenugreek, of each one dram: let them stand a while in a hot place, and then let them be strained.*

If the burning be vehement, & a crust be excited, we must then be very careful that the Eye-lids be not drawn back, which wil cause a great deformity: and therefore a Fomentation by Emollients is to be ordained. As,

Take *Roots of Marsh-mallows, of common Mallows, of each six drams; the Leaves of Marsh-mallows, and common Mallows, the flowers of Melilote, and of the Elder tree, of each half a handful; seeds of Fenugreek, and Linseed, and Quince seed, of each half an ounce; boyl them, and let the Eye-lids be fomented with the Decoction.*

Afterwards let them be anointed with this Unguent:

Take *of the Mucillage of Quince seeds, and Fenugreek, of each two drams; Oyl of sweet Almonds, Mans Fat, of each one ounce; Gum Elemi one dram: let them melt over the fire, and then let them be strained.* Or,

Take *Oyl of white Lilies, Oyl of Eggs, of each half an ounce; Mans Fat six drams; Gum Elemi two drams; new Wax one ounce; Saffron one scruple; let an Unguent be made hereof.*

But then likewise let the Skin be oftentimes extended with both the Hands.

The Burning of the Joynts. If the Joynts be burnt (in regard that they are parts almost bare and void of flesh, nervous, and endued with an exquisite sense) lest there should be caused an afflux of humors, and so a more grievous Malady should thereupon follow, Universal Evacuations are not to be omitted. But let not the Topical Remedies be over sharp, as are those of Onions, Sope, and the like; but let them be mild and Anodyne: and great care must be taken to prevent the contraction of the Nerves, and the incurvation or crooking of the Joynt. As,

Take *Oyl of white Lilies, and of sweet Almonds, and of Earthworms, of each one ounce; the Fat of a Hen, and Mans Fat, of each half an ounce; Unguent Dialthæa six drams; Gum Elemi two drams: Mingle them and make an Unguent.*

Ferula's likewise, or other Instruments, are gently, and without causing any pain, to be fitted unto the Member, to prevent the contraction of the same. But if the Nerves shal chance to be contracted, and the joynts incurvated, then (generals being first premised) the part affected must first of al be fomented with an Emollient Decoction, made of the Root of Marsh-mallows, Briony Roots, white Lily Roots, the Leaves of Marsh-mallows, and common Mallows, Ground-pine or Herb Ivy, Flowers of Camomile, of St. Johnsworr, Linseed, and Fenugreek seed.

Afterward let it be anointed with this following Unguent.

Take *of the Unguent Dialthæa one ounce; Mans Fat, Hens Fat, and Goose Fat, of each half an ounce; the Juyce of Earthworms one ounce: and mingle them.*

And upon the part there is to be imposed the Emplaster Diachylon simplex, and the Emplaster de Melilot. or the Melilote Plaister.

And withal likewise the contracted Member is with fit and convenient Instruments sensibly and by degrees to be extended; such Instruments as these we speak of are to be found lively set forth and delineated in the Chirurgery of *Gualtherus Ryff*, and in *Gulielmus Fabricius* his Tract of Cumbustions; and thither we refer you for the sight of them.

The burning of the Groyns. If the Groins be burnt, (in regard that those places are moist, loose, and very apt to receive fluxions; and because that thither the humors do very easily flow by reason of the vicinity of the Glandules, and that thereupon a Gangrene is there soon excited) let the Medicaments be there more dry than in other parts. And therefore

fore if there shal break forth no Pustules, then the Medicaments that are made of Sope, Onions, and Lime, are very usefull. But if the Pustules be already raised up on high, then let them be timely and speedily opened: and afterward let this Unguent be imposed.

Take *Unguent of Roses one ounce, Unguent Basilique six drams, Oyl of the Yelks of Eggs, and white Lilies, of each half an ounce; Myrrh and Aloes, of each one dram; Mingle them, &c.*

Upon the Unguent let the whol part be covered with such a like Cataplasm;

Take *Barley meal, Bean meal, and that of the Bitter Vetch Orobus, of each one ounce, Pouder of Roses half an ounce; with Honey of Roses, or Oxymel simple, make a Cataplasm.*

But if the burning be great, so that there be fear of a Gangrene, then those Medicaments are to be made use of that shal be prescribed in the Chapter following touching a Gangrene.

Cicatrices how they are to be prevented.

There are likewise oftentimes very unsightly and deformed Cicatrices left remaining after the burning, by reason of the extraordinary drying caused by the Fire. If this be feared it is then to be prevented by applying of Emollients during all the time of the Cure. But those Remedies that are wel enough known to be over drying we ought not to make use of them for the producing of the Cicatrice: to wit, the part is to be fomented with that Decoction that was but even now propounded, as touching the Contraction of the Members. And afterwards the part is to be anoynted with this Liniment:

Take *Oyl of Roses, and white Lilies, of each half an ounce; Mans fat, Hens fat, the fat of the Fish Thymallus, of each three drams; Oyl of Myrrh half a dram, the Juyce of Earth-worms half an ounce; Mingle them.*

The Diet.

And withall let there be a good and right Course of Diet appointed unto the Patient. Let his Diet therefore be such as is Cooling and moistening; and let the sick Person eat Brothes, in which Endive, Sorrel, Lettice, and Borrage were boyled: and on the Contrary let him abstain from those things that are hot, sharp, and salt: let him drink no Wine, but Barley Water, or smal Beer. If need require, there may likewise be appointed the opening of a Vein, and the Purgation of the Body.

Chap. 19. *Of a Gangrene and Sphacelus.*

INdeed a *Gangrene* and a *Sphacelus* are neither Tumors nor Ulcers: neither (to say truth) is Sphacelus so much as a Disease; but only the very Mortification and deadning of the part; but then the Gangrene is a notable and extraordinary Distemper, tending unto the aforesaid Mortification; which may likewise invade the Party without any Tumor at all; yet notwithstanding becaus that most frequently it followeth Tumors, and especially Inflammations, there are some therefore that among Tumors do treat of the Gangrene, and the Sphacelus. But there are others, who (becaus that when the part is Gangrenated an Ulcer necessarily followeth thereupon; and in regard that after the Sphacelus there is an Ulcer left remaining) treat of the Gangrene and Sphacelus among the Ulcers: and these we chuse to follow, and therefore it is that in the end of this Tract touching Ulcers, we thought fit to say somthing of the Gangrene, and the Sphacelus.

A Gangrene what it is.

Now the Gangrene (which they call the Fire of *Marcellus* or St. Anthonies Fire) is an imperfect Mortification or Corruption of a part, tending unto a *Necrosis*, that is to say, a deadness or Mortification; unto which unless there be speedy and fit Remedies administred for the Curing thereof, the Member becometh altogether dead, loseth all sense and life, and feeleth nothing at all, whether it be Cut or burnt: which *Necrosis* being already thus far perfected is by the Latines termed *Syderatio*, and by the Greeks *Sphacelus*; so that these two Maladies differ not but only in their greatness. For in a *Sphacelus* the part is wholly deprived of all sense and life, and is altogether dead: but in a Gangrene there is not as yet present a perfect Corruption of the part. And in regard that in a Gangrene there is not as yet so great a Corruption, neither a perfect and absolute Mortificacion, therefore it only invadeth the softer parts: but now the *Sphacelus* (in regard that it is a perfect, entire and absolute Corruption of the part) doth not only invade the softer parts, to wit, the Skin, the flesh, the Veins, the Arteries, and the Nerves; but it likewise corrupteth and spoyleth even the very bones themselves. And yet nevertheless we acknowledg, that in the *Sphacelus* likewise the softer parts are at first only corrupted, and that not the bones, but the Veins also, and the Arteries, and the Nerves, remain and continue safe and sound; but yet if the putrid part be not speedily separated, it cannot possibly be avoided but that the more solid parts must likewise be infected with this putridness.

The difference between a Gangrene & Sphacelus.

The

The Causes.

Whenas therefore in the Gangrene and Sphacelus there is caused a Mortification of the Member; in the Gangrene indeed one that is but only beginning; but in the Sphacelus a perfect and absolute Mortification; and that the mortification of the part dependeth upon the destruction of the innate and natural heat (as on the contrary, the life of the part dependeth upon the preservation and safety of the said Native heat) we conclude that whatsoever destroyeth the Native heat of the part, that same may likewise be accounted a cause of the Gangrene and Sphacelus. Now the Native heat is destroyed, when by its contrary it is either corrupted or suffocated, or dissipated, or altogether extinguished for want of Aliment. It is destroyed by its contrary, either acting by a manifest quality, and cold; or else by a secret and hidden quality, as by poyson. It is suffocated, when the transpiration is hindered: It is dissipated by a greater heat: It is extinguished, if necessary food and sustenance be denied: so that there are (as you see) five causes of the Generation of a Gangrene and Sphacelus: to wit, overmuch cold, a poysonous quality, the hinderance of transpiration, a vehement external heat, and a defect of Aliment, and the heat flowing in.

For first of al we see that oftentimes (in the Winter) those that take Journeys in the Snow and Ice have the extream parts of their feet, and of their hands, their Ears, and their nostrils almost dead with cold, by reason of the vehemency thereof: and thus it happeneth somtimes also, that by reason of Medicaments over cooling in a Phlegmone, or an Erysipelas, carelessly and incautеously administred, the part is taken and surprised with a Gangrene, or a Sphacelus: although I had rather refer this case unto transpiration hindered.

There is also a very great power of destroying the innate heat in those things that are poysonous, and such things as destroy our Bodies by a secret and hidden quality. For somtimes the humors in our bodies do so degenerate, and acquire so great a malignity, that they bring a *Necrosis* or deadness unto those parts whither they are by Nature thrust, as we see it done in a Carbuncle. And so in like manner the biting and stingings of poysonful Creatures do corrupt and putrefie the parts. And the same also is done by the Septick Medicaments, which if they be not wisely and carefully administred have in them a power of corrupting the flesh; especially in places that are hot and moist, as in the Emunctories, the privy parts, and the other places that are like unto these.

Thirdly, Transpiration hindered exciteth likewise a Gangrene. For whereas our heat standeth in need of perpetual ventilation and cooling, if this be denied, it is suffocated by the abundance of Vapors. And for this very cause in great Inflammations, and especially in the moist parts, there very frequently happeneth a Gangrene, the Native heat being extinguished; as otherwise likewise we see that a little flame is extinguished and put out by casting thereon good store of water; and that the flame is stifled if it be put under a Cupping-glass that hath no hole or vent in it, or any other Vessel whatsoever that is kept covered, which is preserved in a Cupping-glass that is perforated, or any other Vessel that is open. And this chiefly happeneth, if in Feavers (especially if they be malignant) the humors be with violence either thrust forth, or that of their own accord they rush unto any one part. And so I remember that here a certain Citizen that was taken with a malignant Feaver, from the humors that were thrust down unto the *Scrotum*, had the said *Scrotum* al of it so inflamed and mortified with a Sphacelus, that there was a necessity of cutting off the whol *Scrotum* or Cods, so that the stones hung down altogether naked and bare; which yet notwithstanding (the Gangrene being cured) became afterwards covered again with flesh that grew out of the Groyns. That Inflammation likewise which the Gangrene followeth is sometimes caused by Wounds, and these not alwaies great, but oftentimes also very smal and sleight Wounds, that seem inconsiderable, and of no moment. So *Henricus ab Heer* relateth in the first Book of his rare Physical Observations, Obser. 12. That he was present and saw a man fifty nine yeers of Age, who having pared the Nails of his Toes, and cut them to the quick, was presently surprized with a Gangrene, and within a very short space died thereof. And he telleth us likewise of two other eminent persons, who being desirous to have the hard and callous brawnines of their feet pared away, were both of them taken with a Gangrene that within a short time caused their deaths. And this may likewise be done by Emplastick Medicaments, in great Inflammations, and especially if they be unseasonably applied in moist places, which frequently produce there a suffocation of the Native heat.

Fourthly, A preternatural heat likewise, and such as is extraneous and from without produceth the Gangrene, by wasting the Radical moisture, and the Native heat: and so many times a Gangrene followeth after great burnings.

And lastly, A Gangrene ariseth from the defect of Aliment, to wit, the blood, and the spirit flowing in, that is altogether necessary and requisite for the cherishing of the Natural heat implanted within. For whereas the innate heat standeth in need of continual Nutriment (as the flame doth of Oyl) if this be denied, it languisheth and is extinguished; like as is the flame when the Oyl in the Lamp faileth. And in this manner a Gangrene happeneth unto the external parts of the body, somtimes in an Atrophy, Consumption, and the like Chronical and long continued Diseases

that extenuate the body. And for this very cause it is that when the greater Joynts are put out of Joynt, if they be not again wel and rightly set, then the disjoynted bone presseth together the vessels that lie neer, and hindereth the influx of the blood, and of the Spirits into those parts that lie underneath; from whence there followeth a leanness and consumption of the said parts, and in process of time very frequently a Gangrene also. And so it is found by experience, that from a hard Tumor about the *Vena Cava* (where parting several waies it descendeth into the Thighs) pressing the same together, and hindering the descent of the blood into the Thigh, a Gangrene very often ariseth. And in this manner a Gangrene likewise happeneth, if any part be too hard and long bound about with Ligatures and bands; or else if Medicaments that are over astringent shal be imposed upon any part.

Signs Diagnostick.

It is no hard matter to know the Gangrene. For the color of the part beginneth to be changed and turned unto black, the flesh to grow loose and flaggy, the pulse and sense to be diminished, and the heat to be abolished. Which said Symptoms the more the Gangrene tendeth unto a perfect corruption and a Sphacelus, by so much the more are they increased and made more evident. For in a perfect and absolute corruption and Sphacelus the life and sense of the part are wholly abolished; there is no pulse at al to be perceived; the part, whether you cut or burn it, is insensible of pain; the flesh appeareth to be cold, is made soft and flaggy, so that it yieldeth unto the touch when it is pressed by the fingers; which yet nevertheless, after it is throughly dried, becometh black, wan, and altogether deadned, and it yieldeth a noysom and stinking savor like that of a dead Carkass; and the skin if it be taken up with the fingers seemeth to be separated from the flesh lying underneath it. And here *Ambrose Parry* adviseth every Physitian, that when he hath discovered by these signs that there is a Gangrene, and a Sphacelus, he no longer defer the doing of what is to be done, neither suffer himself to be deceived by the motion; some whereof is oftentimes stil left remaining even in a mortified and dead Member. For in a Sphacelus the corrupted parts are moved, not by the motion of the whol and entire Muscle, but because the Head (and no more) of the Muscle is yet whol; the which while it is moved, it doth together with it draw the Tendon that is inseparable from it, and the tayl likewise thereof, although it be now wholly dead, and without any true and proper motion.

And these signs (that appear in a perfect corruption and Sphacelus) are stil the same in every one of them; whatsoever the cause be that it draweth its original from; whether it be from cold, or from a poysonous quality, or from transpiration hindered, or from an extraneous heat, or lastly, from the defect of Aliment; unless it be in this only that such like Symptoms in a Sphacelus that hath its original from an occult cause and such as is poysonous (as for example, the *Delirium* or dotage, the *Syncope*, and the like) are greater and more grievous. But in a Gangrene and mortification that is but yet now beginning, there is observed a diversity of the signs and symptoms, according as the Gangrene hath its original from divers and different causes. For in a Gangrene that ariseth from cold there suddenly appeareth an acute and pricking pain, and a redness in the part, which soon after is changed into a black color; and the heat that was in the part is extinguished; and there is perceived a coldness and stupidity (with a certain kind of horror) as it useth to be in Quartan Agues. And moreover, in a Gangrene that proceedeth from a poysonous and malignant humor in the body, which Nature thrusteth forth unto the external parts, there is present a continual Feaver, and a strong conflict of Nature with the Disease; from whence the *Syncope*, Dotage, and the like, have their original; and such a Gangrene as this ariseth for the most part in the external Members, and the extream parts thereof, (as for instance, the great Toe of the Foot) with a certain Pustule or Bladder, (under which there is present a black spot) which oftentimes is suddenly derived into the whol Leg and Thigh.

But that Gangrene that followeth upon great and extraordinary Inflammations (that proceed most usually from the hinderance of Transpiration) is known by this, That the fresh and flourishing color that is wont to appear in Inflammations is turned into that which is pale and wan; that beating pain which before did infest now ceaseth, the sense is become dul, and there arise very great Pustules that are ful of a thin ichorous excrement, like unto that that cometh from the washing of raw flesh. Which appear almost the same, when the Gangrene hath its original from an extraneous heat. If lastly, the Gangrene seize upon the part by reason of the want of Aliment, or through a dry distemper, then there is present neither pain nor inflammation, nor swelling, but rather a leanness, and the body is immediately cooled; and this Gangrene happeneth for the most part in those places of the body that are the utmost and extream, as for instance, the Ankles and Toes. But when at length the Pustules arise, and the part becometh pale and wan, then the pains likewise appear, and the Feaver is excited. But if the Gangrene happen by reason of hard tying and Ligatures, then the part swelleth and is distended, and there arise greater Pustules, ful of a thin excrement, resembling the washing of raw flesh: but the evident Causes we may easily learn and understand from the sick person himself.

Progno-

Prognosticks.

1. That the Gangrene is a Malady very dangerous is sufficiently manifest unto every one. For unless it be speedily cured, it degenerateth in a very short time into a Sphacelus, and the part becometh altogether dead. For this cause therefore there is not any the least delay to be made; but help is to be afforded with al possible speed: which may be done with less difficulty in a body that is as yet young, strong and vigorous, where the vital spirits are as yet entire, and especially where the Muscles and Nerves are as yet unhurt.

2. But that Gangrene which is with an afflux of poysonous humors, and an occult quality, is more difficult to be cured than that which is without any such afflux: for there are but very few that recover of such Gangrenes.

3. There are Gangrenes that are yet more dangerous, and these are they that begin in the moist parts: for the innate heat is sooner suffocated in such parts by the great store of humors abounding therein.

4. And for this cause it is that the Gangrene that ariseth in Hydropical persons is likewise very seldom cured, but most usually it degenerateth into a Sphacelus; and that which ariseth from the Antecedent Cause is likewise ever more dangerous than that which hath its original from the primitive Cause; in regard that in the former the Bowels are more affected.

5. But a Sphacelus is yet far the more dangerous Malady. For the part that is taken with the Sphacelus can no way be restored and made sound again; but it is forthwith to be cut off, and separated from the part that hath life: which if it be not speedily done, then the sound parts that lie neer wil likewise be infected, and the putridness wil at length creep into the rest of the body, from whence there wil be extream danger of present death; before which there usually precede Dotings, Watchings, the *Syncope*, Convulsions, Ructures and Belchings, Sobbings, and a cold Sweat breaking forth over all the Body: and some of them die while they are yet speaking, and others of them die being as it were oppressed with sleep.

The Cure.

The Cure of the Gangrene that it may be rightly proceeded in, first of al regard is to be had unto the Dyet (and the Antecedent Cause, if it be present in the body) before ever we come to Topicks. Most Physitians prescribe and command a Diet that is cool and drying: which albeit that it be most true of that Gangrene that is accompanied with an afflux of Humors, and followeth great Inflammations: yet nevertheless the Diet is sometimes also to be varied according to the variety of the Causes; as anon in the species or several kinds of Cure we shal further shew you.

And so also the Evacuation of the blood, and the preparation and purgation of the vitious humors ought to be enjoyned, according to the Nature of the peccant humors. This in the general is to be pre-cautioned, that regard be had unto the Heart, that it be wel and safe guarded against al the malignant vapors that exhale from the putrifying part. And therefore we must here administer for the comforting and strengthening of the Heart, Medicaments of Borrage, Bugloss, Carduus Benedictus, the smallest Sorrel, Bole-armenick, Terra sigillata, Bezoar stone, Citrons, Treacle, Mithridate, Species of Diamargarit. frigid. Electuarium de Gemmis, Confection of Hyacinth, Alkermes, and the like. Or,

Take *the Water of Scabious, Sorrel, Borrage, Roses, and Carduus Benedictus, of each one ounce and half; Syrup of Sorrel, Citrons, and Pomegranates, of each one ounce; the species of Diamargarit. frigid. Bole-armenick, and Terra sigillata, of each one scruple; Mingle them, and make a Potion.* Or,

Take *Conserve of Roses two ounces; of Sorrel, of Borrage, and of Gilliflower, of each one ounce; Citron rind candied, Rob de Ribes, of each half an ounce; prepared Margarites, Bole-armenick, Terra sigillata, the temperate Cordial Species, of each one scruple; Syrup of Sorrel, and of Citrons, as much as wil suffice, and mingle them.*

Let the Heart be likewise guarded externally with Topicks: As,

Take *the Water of Roses two ounces; of Borrage and Sorrel one ounce and half; of Carduus Benedictus one ounce; Vinegar of Water-Germander six drams; Spirit of Roses one scruple; Mace, Lign-aloes, Rinds of the Citron, of each half a dram; Saffron half a scruple, Camphire six grains: Mingle them, and make an Epithem,* which must be applied unto the Region of the Heart, for its defence and preservation.

In a Gangrene likewise for the most part the sound part ought to be fenced and guarded; and we must be alwaies doing our endeavor, that the said part receive none of the putridness. And for this end the above mentioned Defensives of Bole-armenick, and Terra sigillata must be administred; unto which (by reason of the malignity) Water Germander may be added, and mingled therewith. As,

Take *Bole-armenick one ounce; Terra sigillata half an ounce, Harts-horn burnt and prepared one dram, Camphire half a dram, Wax six drams; Oyl of Roses four ounces, Rose Vinegar one ounce, the juyce of Water Germander half an ounce, the white of one Egg: mingle them and make an Unguent.* As,

Take *Bole-armenick, and Terra sigillata (or sealed Earth of Lemnos) of each half an ounce: Mingle them with Vinegar of Water Germander.*

Gulielmus Fabricius frequently made use of this that followeth.

Take *Barley meal four ounces; Bolearmenick two drams, Galls, Cypress Nuts, Pomegranate rinds, of each one dram and half; with a sufficient quantity of Oxymel simplex make a Cataplasm.*

A Gangrene from overmuch cooling.

But now that we may come unto the more special Cure, we will in the first place declare unto you, in what manner the Gangrene that hath its originall from an overgreat cooling ought to be Cured. But now that it may be wel known, how and in what manner al those are to be dealt withal that have been over cooled (whether it be so that the Gangrene be already present and in being, or that it be only neer at hand) we wil from the very beginning briefly pursue and declare the truth of the thing.

The Cure of such as are overcooled.

If therefore there be any one over cooled, yet notwithstanding that as yet there is no Gangrene present; neither is the part as yet become wan, pale, and cold, but that there is rather a redness in the part, together with a vehement and burning pain; then in this case the man is not instantly to be moved neer unto the Fire, but he is rather to be placed somewhat more remote from it, that so by degrees the heat may recover and recollect it self. But if it be so that the part be not altogether stiff and stifled with cold, so that there be no longer any blood left therein, then it is forthwith to be wel chafed, and rubbed with Snow; or the overcooled members are likewise to be throughly washed with cold water, upon which they wil begin by little and little to wax warm, and to recover their former heat. Which the Inhabitants of the Northern Climates have much in use; who are wont when any Travellers are overcold, stiff, and almost dead therewith, first of all to plunge them deep into cold water; and before ever they give them any entertainment, to wash and rub their Hands, Feet, Noses, and other Members, with Snow. And that from the inward parts the heat may the more strongly diffuse it self unto the external parts, and that all the cold may be expelled, it wil be requisite to administer suppings made of Wine, and to drink Wine and Treacle mingled together. The aforesaid People of the Septentrional Regions use to give their Guests (when they are almost dead with cold) Hydromel, with the Pouder of Cinamom, Cloves, and Ginger, and the like Spices; after which they put them to bed, and cause them there to Sweat. For which purpose there be some that outwardly apply likewise unto the body Flagons or Stone Pots ful of hot water. Afterward when the pain and the coldness are something mitigated, gentle rubbings with the hands anoynted with the Oyl of Camomile, sweet Almonds, and Dil, are to be administred; and the parts are to be fomented with sweet Milk, in the which there may also be boyled the Leaves and Berries of the Lawrel, Rosemary, Camomile, Sage, Organy, French Lavender, and the like. The Decoction of Rape roots is likewise singularly useful; and commonly unto those members that are pained with overcoldness they use to apply the Decoction of Rape roots that have been first frozen with cold.

After this we must betake our selves unto those things that are hotter, such as the Oyl of Lilies, of Turpentine, of Wax, Nettle seed, Cresses. But if there be not only a fear of a Gangrene, but that there also be one already present, and that the Member already begin to die, we must then use our utmost endeavor that the heat may be preserved in the part, and that from other parts it may be again called back unto it: and therefore here is little or no benefit to be expected from Defensives, but Scarifications are rather to be administred, and the parts to be fomented with those hot Medicaments that were but even now mentioned; unto which we may add Scabious water, Germander, the Root of *Asclepias* or Swallow-wort, and the like. Unto the parts there may be administred, Treacle, Mithridate, Trochisques of the Viper, the Ley in which Water Germander hath been boyled, and Treacle Waters.

A Gangrene from the afflux of Malignant humors.

Secondly, If the Gangrene hath its original from the afflux of Malignant humors, or a malignant quality; then by appointing a Cooling and drying Diet, and by administring of Meats sauced and seasoned with Citrons, Lemmons, and Pomegranates; and likewise by evacuating and emptying forth of the peccant and depraved humors, either by opening a Vein, or by purging Medicaments (if need require, and that the nature of the Disease, and the strength of the Patient wil bear it; but we are here alwaies to take heed how we give those things that are too strong) the Malignity is to be expelled, and the depraved matter to be driven forth from the more inward unto the external parts; and such a like Cure almost is here to be instituted, as is wont to be in malignant Fevers; to wit, there are Medicaments to be administred of Citrons, Sorrel, Roses, Borrage, Water Germander, Carduus benedict. Dittany of Crete, Swallow-wort, Angelica, Treacle likewise and Mithridate. And we must do our endeavor that a Sweat may be provoked by these medicaments, and that the Poyson may be driven forth from the Noble members unto the exterior parts. Which that it may the more successfully and more eafily be done, the malignant matter is likewise by Topicks to be drawn forth unto the external parts.

Where we are also to take notice, that if poyson stick outwardly unto the body (as it happeneth oftentimes from the strokes of poysonful Creatures) then Defensives are to be administred, lest that

that the Poyson creep broader, and spread it self unto the more interior and Noble parts. But if the malignant matter be bred in the body, then Defensives are by no means to be administred; but the said Matter is only to be called forth unto the external parts; unto which end Scarifications may be administred unto the part affected, Cupping-glasses likewise and Leeches may be applied; and moreover the part also may be washed with the Decoction of those Medicaments that resist malignity and putridness; such as are Wormwood, Rue, Dittany, *Asclepias* or Swallow-wort, Angelica, and especially Water Germander, which is of a most soveraign virtue in all Gangrenes, and that that hath in it an extraordinary power to preserve from putridness. And others there are that to attract do make use of the Raddish root, the Seed of Cresses, and the like.

But if Poyson shal chance unto the body from without, and shal either by a blow, biting, or any other touch be transused into the part affected; then those Medicaments that do strongly attract the Poyson, dry it up, and consume it, are to be made use of: for which end and purpose, an actual Cautery may most fitly be administred. The part affected being either scarified, or burnt, then there are further to be applied those Medicaments that resist putridness, and prevent the *Necrosis* or Mortification, and such as do also attract and draw the offensive and depraved matter; as an Emplaster of the aforementioned Medicaments; with which we may likewise mingle Leven, and Garlick roasted in the Embers. And at length, the Gangrene being in a fair way of recovery, if there hath happened any Ulcer from the scarification or burning, it is then to be cleansed by Medicaments of the Juyce of Smallage, and Honey of Roses (unto which if need be, there may be added some Spirit of Wine) and other things are moreover to be done that are fit and convenient for the Ulcer.

A Gangrene from Inflammation

Thirdly, The Gangrene that is wont to follow upon great Inflammations, and to arise from the abundance of blood and humors that suffocate the Natural heat of the part, is cured in this manner. First of all, the Diet that is appointed ought to be slender, and such as is cooling. The blood and humors that flow overmuch into the part are to be emptied forth of the whol body, by opening of a Vein, Scarifications Cupping-glasses, Purgers, and other convenient Remedies; and lest that they should any longer flow into the affected part, they are to be drawn back, and derived unto some other place; and round about the part affected there is some kind of Defensive to be applied, as we told you above, in the first Part, Chap. 5. touching an Inflammation.

And then immediately the blood and humors that are corrupted in the part, and suffocate the Native heat, are to be evacuated out of the part affected, that so the cause may be taken away, and the former heat and vigour may be restored unto the Member.

Wherefore the part must presently (since that there is danger in delay; and the blood that hath already begun to be corrupted, by reason of its abundance and thickness can hardly be digested or dissipated by Medicaments) be scarified with many sections, and these ought to be made deep enough; and of the corrupted blood a sufficient quantity (to wit, great store and plenty thereof) is to be evacuated. And yet nevertheless, in the greatness and depth of the Incisions, we ought to have respect unto the greatness of the Affect it self; and according as the Affect is more or less nigh unto putridness, and a *Sphacelus*, so thereafter the Incisions are to be moderated. Some likewise there are that apply Leeches, or the lesser sort of Cupping-glasses, if the blood be not sufficiently and plentifully evacuated by scarifications alone. The Incision being made, the part is to be washed with salt water, or a Ley; unto which we may likewise add Lupines, or Aloes, and boyl them together; that so if any of the thicker blood continue yet sticking in the part, it may be washed off; and that the Reliques or Remainders of the putrid matter may be evacuated; and al possible resistance made against the putridness. And for this end, this Decoction following may be made use of; with the which the affected Member (as often as any new Medicaments are applied) is to be washed.: *Viz.*

Take *of the strongest Ley, and of the best Vinegar, of each one quart; of Water Germander, Lupines, Wormwood bruised, of each half a handful; of Flowerdeluce root, round Aristolochy, and Swallow-wort, of each half an ounce: let them all be boyled to the consumption of the third part; unto the streining add of Aloes and Myrrh pulverized, half an ounce; and then let them boyl once or twice again: at length add Honey of Roses one ounce, Spirit of the best Wine three ounces; Mingle them, &c.*

When the part is washed, then the Ægyptiack Unguent is to be laid on; which here is reputed the most excellent of all the rest, as being a most efficacious Remedy for the taking away of putridness, and for the separating of the dead flesh from the sound. But if the Corruption be more then ordinary, then *Gulielmus Fabricius* compoundeth such a like Remedy as this following, which likewise resisteth malignity.

Take *Rust of Brass three ounces, of the best Honey, and with the Decoction of Wormwood, and Water Germander scummed, one pint, Vinegar of Squils, six ounces, Alum, and Salt Armoniack, of each half an ounce; the Juyce of Rue, and Water Germander, of each two ounces; boyl them to a good thickness: and afterwards add of the best Treacle and Mithridate,*

of

of each half an ounce; Camphire one dram, and mingle them.

This Water is likewise very useful, if a wollen Cloth be wet therein, and so imposed upon the place affected; it hath likewise been happily and successfully administred in the Gangrene of the Cods; of which we have spoken above.

Take *Vitriol one ounce, the tops of the Oake one handful, Frankincense half an ounce, Camphyre two drams, Urine two pints and half; boyl them to the Consumption of a third part, and then strain them.*

But the Ægyptiack Unguent is not alone to be applied, but upon the Unguent that Cataplasm is also to be imposed, which resolveth, drieth, and hindreth putrefaction; such an one as *Johannes de Vigo* in his second Book, first Tract, and seventh Chapter describeth and commendeth; and which many other Physitians and Chirurgeons now a daies likewise make use of. And all these are to be applied blood-warm; and they are so long to be continued, untill the putridness be removed.

But if the Malady wil not yield unto these Remedies, then we are to have recourse unto those that are stronger, to wit, Causticks, such as those Trochisques of *Andro*, *Polyidas*, *Musa*, and *Pasio*, which dissolved in Vinegar and Wine may be imposed upon the part. Many indeed do here commend, and prefer Arsenick before all other Remedies; but *Gulielmus Fabricius* doth (and not without good Cause) reject and altogether disallow of it in the Cure of a Gangrene, as that that not only hath in it a Septick and putrefying faculty, and a quality of melting the flesh, as it were; but that likewise produceth very great and grievous Symptoms, vehement pain, Dotings, Syncope's, and the like, the malignant vapours being communicated unto the principal part. It is therefore more safe to make use of an actuall Cautery, as that which hindereth and preventeth putridness, drieth and corroborateth the part.

This is also much commended.

Take *Mercury*; *dissolve it in Aqua fortis*; *when it is dissolved, precipitate it the Oyl of Tartar*; *after it is precipitated, wash it.* Or Mercury alone dissolved and mingled with the Water of the Trinity Flowers; and wollen Cloaths wet in this Liquor may be imposed on the part.

The Crust in what manner soever it be produced is to be taken away by those Medicaments that have been above declared, in the first Part, and Chap. 13. touching a Carbuncle. Neither are we to wait so long til Nature shal altogether have separated the Corrupt from the Sound, but the highest part of the Crust is with the edge of a Knife or a Penknife to be cut even unto the found part, that so there may be a way made for the Medicaments unto the deeper parts, and the rest that are corrupted. For if we expect until the Crust shal be freed of its own accord, it may possibly hrppen, that under the Crust a new putridness may be contracted. The rest of the Cure is in the same order to be proceeded in, as is fit to be done in Ulcers.

A Gangrene from too much heat.

Fourthly, If the Gangrene happen from overmuch heat, then (a Cold Diet being prescribed, and the hot humors being duly qualified and evacuated) if the Malady take its original from an internal Cause, the Member affected is to be scarified, and then washed with such a Decoction as this.

Take *the Water of Endive, Sorrel, Lettice, Nightshade, and Vinegar, of each one pint; Syrup of Sorrel, two pound, of Lupines half an ounce, Water Germander half a handful, Salt three ounces: boyl them till a third part be consumed.*

After this the Ægyptiack Unguent, and the Cataplasm but even now mentioned, is to be imposed; and the rest which were before prescribed are speedily to follow. Where notwithstanding this is to be observed, that (unless in case of urgent necessity) we must not have recourse unto the actual Cautery, lest that hereby (to wit, by the power and force of the fire) the extraneous heat, which is the Cause of the Gangrene, be augmented.

A Gangrene by reason of an Atrophy in the part.

Fifthly and lastly, If the Gangrene arise from the defect of Aliment, and Blood, and Spirits, and chiefly in truth if it be by reason of a Drineſs, and an Atrophy (necessary Nutriment being denied unto the part) then meats that are hot and moist, easie of Digestion, and such as generate much and good blood, are to be given unto the sick Person; and outwardly the body is likewise to be moistened with Oyntments of sweet Oyl, or with Oyl of sweet Almonds; and all things are carefully to be avoided that exsiccate and dry the body. And unto the part it self that is already affected with the Gangrene the Aliment is by all manner of means to be attracted. And therefore here there is no place left for Defensives; in regard that they shut and stop up all passage of the blood and Spirits unto the part affected. And therefore we are not only to anoynt the part affected and the other members with the Juyce of Earth-worms, which is made of the said Earth-worms first washed in Water, and then in Wine, & so put into a great Vessel with good store of the Oyl of sweet Almonds & Violets, and melted by a gentle and moderate heat over hot Embers, and afterwards strained (which is a special and soveraign Remedy in the Atrophy, and extenuation of the parts) but the part affected is therwith likewise gently to be rubbed and chafed; unto which also Cupping-glasses not scarified are to be applied. But it wil be most fit and requisite, if there be already present a putridness, to

administer

adminiſter thoſe things that do alike both attract and reſiſt putridneſs; ſuch as are, Salt Water boyled with Water-Germander, Liquid Pitch, with the meal of Lupines, of the bitter Vetch Orobus, Myrrh, and the like. But if the Gangrene hath already made any progreſs, the part is then to be ſcarified, and the Ægyptiack Unguent, and that likewiſe that is compounded of Pitch, and thoſe other things a little before mentioned, are to be laid thereon.

A Gangrene from the interception of the blood & ſpirits.

Moreover, If the Gangrene happen from the interception of the Blood, and the Spirits likewiſe, (whatſoever the Cauſe then be that thus intercepteth the blood and the ſpirits) it is immediately to be taken away; as, if the ſaid interception be from the binding of the part, it is forthwith to be looſened; and withal thoſe Medicaments that reſiſt putridneſs, as likewiſe thoſe that diſcuſs that that is corrupted (ſuch as are thoſe that are made of the Meal of Beans, of the bitter Vetch Orobus, of Lupines, Aloes, Water-Germander, and the like) are to be impoſed. And if the Gangrene hath already gotten unto any heighth, the place is to be ſcarified; and thoſe other things that are required in al Gangrenes, are to be done. If an aſtringent and repelling Medicament be the Cauſe, the ſaid Medicament being removed, the heat is to be recalled by Frictions, Lotions, and Anointings. And ſo we muſt alſo proceed in the Gangrene that hath its original from other Cauſes that intercept the Spirits. For the Cure of the Gangrene it ſelf doth ſcarcely at al differ; the difference lying only in the removal of the Cauſes. But if the Malady be come to that, that the Member is now already altogether mortified and dead, and that it be ſphacelated, from whatſoever cauſe it be that the Malady hath its original, there is then one only way of curing it. For ſeeing that what is altogether dead in the body cannot poſſibly recover life again, and that it hath now altogether the nature of a thing that is preternatural, there is this one only Indication, to wit, that it is to be taken and amputated from the body. Which if (by reaſon of the unfitneſs of the place) it cannot conveniently be done, then the caſe is wholly deſperate. For ſome parts are much more fitly ſituated for amputation than others; as for inſtance, the fingers, the feet, the hands, the genitals may be cut off with leſs danger. But if the Malady be in the Thorax or Cheſt, or in the Belly, the parts cannot then be cut out, and eſpecially if there be many particles of the Member at once infected. For it ſometimes ſo falleth out, that the whol Member is not to be taken away, but only ſome part thereof. But oftentimes indeed the whol Member is wholly to be amputated and cut off, to wit, when the putridneſs hath ſeized upon and corrupted al the parts thereof round about: which in ſome may be ſpeedily done, and without any great danger, as in the *Scrotum* or Cods; but in other parts the amputation is ful of difficulty and peril; as in the Feet, Arms, and Hands. But after what manner the ſaid amputation and the taking away of that which is corrupted is to be performed, we wil now acquaint you. Now this may be done divers waies; ſome there be that having firſt applied a Defenſive upon the ſound part, they then with many ſtraight and oblique Sections ſcarifie the dead fleſh that lieth neer unto the ſound; and this they do very deep, even unto the very bone. And afterward upon the Wounds they ſtrew the pouder of Arſenick and Sublimate, that ſo the mortified part may be ſeparated from the ſound. But in this way of extirpating the corrupt fleſh, Arſenick (as we lately gave you notice) is ſuſpected; and therefore in the ſtead thereof we are to adminiſter other burning Medicaments, of the aſhes of Vine-ſprigs and unſlaked Lime. The Cruſt that is al over the part affected is to be taken away with a Pen-knife; neither muſt we expect til it be ſeparated of its own accord. Yet nevertheleſs, that the dead part may be dried, and be eaſily ſeparated from the ſound, *Fallopius* applieth this Sparadrape:

Take *Aloes, Myrrh, Acacia, Gallia Moſchata, Alipta Moſchata, al the Saunders, Lign Aloes, Cumin, Allum, of each one dram; make a Pouder:* Of which,

Take *one ounce; Ship-pitch, Roſin of the Pine-tree, Colophony, of each two ounces; Frankincenſe, Maſtick, Styrax liquid, of each one ounce and half; Gum Arabick, and Tragacanth, of each half an ounce: Let them be all melted; put a Linen cloth into the Liquor until it be throughly ſoaked in the Medicament.* And afterwards let al other things be done, as it uſeth to be in other Ulcers. There are others that with an actual Cautery burn that that is corrupted, even until there be a pain perceived in the part; and al other things are afterward to be done according to art.

But now *Fallopius* doth adviſe us (if much dead fleſh be to be taken away) not to make uſe of an actual Cautery alone, in regard that from the ſaid burning there wil be cauſed a moſt abominable loathſom ſtench. Others there are that by Section and the Razor amputate that that is corrupted; and afterwards to avoid the Hemorrhage, and to dry up and conſume the reliques, they apply likewiſe an actual Cautery, if need require. But what hath hitherto been ſpoken touching this way and method of Curing, is to be underſtood only of that Sphacelus wherein the whol Member is not corrupted, and when there is no cauſe of taking away the Bone likewiſe.

For

The cutting off the corrupted Member, when to be done.

For if the whol Member be corrupted, and therefore to be amputated; this cannot be effected either with an actual Cautery, or a Potential; neither yet with a Razor; but there is a neceſſity of cutting off the whol entire Member, the Foot, the Hand, &c. But in what manner this amputation ought to be performed, Authors differ much in their opinions concerning it. *Celſus* in his ſeventh Book, and Chap. 33. perſwadeth us to make the Section between the ſound fleſh and the dead; and rather to take away ſome of the ſound, than to leave any of the dead fleſh remaining, leſt the Malady that is left corrupt that that is ſound. Which way of curing moſt of our late Phyſicians diſapprove of, by reaſon of thoſe dangers that follow the Section in the ſound part, to wit, an immoderate profuſion of the blood, and an extraordinary great pain, and the faintings and ſwoundings that depend upon theſe. And therefore that theſe may be avoided, they adviſe us to make the Section in the corrupted part alone. *Fallopius* indeed with a Razor cutteth into the dead fleſh (even unto the bone) a fingers breadth diſtant from the ſound part; and then after this he forthwith taketh away the bone with the ſaw; and then again with Irons red hot he burneth the greater Veſſels, and the fleſh, even unto the cauſing of pain. *Hieronymus Fabricius* alſo leaveth a portion of the ſound fleſh (as much as one fingers breadth) and appointeth the Section likewiſe to be made with a Razor in the dead fleſh; and he afterwards burneth the part with fire-hot Irons (after the ſame manner) to hinder and reſtrain the Hemorrhage, and to waſte and conſume the reliques of the putrefaction.

But here in this place we are to adverтiſe you, that ſomtimes the putridneſs wil yet creep further, and infect the neer neighboring parts; but then again, that ſomtimes the putridneſs ceaſeth, neither doth it creep any further unto the parts neer adjoyning; which whenſoever it happeneth, then round about the corrupted part there appeareth a Circle that is exactly red, and of an exquiſite ſenſe. In the latter caſe indeed, that way of curing ſeemeth not altogether improper and unfit, in a part that is corrupted and dead. For by this means thoſe many dangers which accompany that Section that is made in that part that is alive, are prevented; to wit, the profuſion of blood, pain, and faintings; ſince that through the corrupted part the blood cannot paſs; and becauſe that the ſaid part hath no ſenſe at al. But if there be any of the dead fleſh left remaining, this, when the putridneſs ſhal ceaſe any longer to creep (although there ſhal not be any Cauteries adminiſtred) wil afterwards divide it ſelf of its own accord; and then it wil be ſeparated by Nature, upon the adminiſtring of fit and proper Medicaments. But if as yet the putridneſs be creeping forward, and that Nature hath not as yet of her own accord begun to ſeparate the ſound from the corrupt, then the Section cannot be inſtituted in the corrupted part alone, without preſent danger. For it oftentimes falleth out, that in the interior parts, and in the bottom of a Member, the corruption penetrateth far deeper and further than in the skin it appeareth to do. For the Muſcles and their Veſſels in the interior parts (in regard that they are there hotter than they are without) do eaſily receive the putridneſs. Wherefore if any wil yet be inſtituting the inciſion in the mortified part, ſeeing that he leaveth behind much putridneſs in the interior parts, either he wil haſten ſudden death upon the ſick perſon (by leaving the ſaid putridneſs that wil be alwaies creeping further, deeper, and broader) or elſe by reiterating and renewing of the Section he muſt needleſly and unadviſedly again excruciate and torture the Patient. Neither maketh it any thing at al to the matter that the pain is excited in the ſound part. For as *Celſus* ſaith in the place before alleadged, it is little or nothing material, whether that guard and defence be ſufficiently ſtrong and ſafe, that is but one alone. And as *Hippocrates* hath it, *Unto extream Diſeaſes the Remedies that are to be adminiſtred muſt likewiſe be extream.* But in very truth, the pain may in a manner be moderated, and the ſenſe obſcured by the faſtening on of the Ligatures, intercepting the paſſage of the Animal Spirits for a certain time, as we ſhal afterward ſhew you; and likewiſe how with a very ſharp Razor the Section ſhal be almoſt quite finiſhed, before ever the ſick Perſon ſhal perceive what it is in doing. But yet they themſelves who make the Section in the the Corrupted part cannot (notwithſtanding) hereby prevent all manner of pain. For ſo ſoon as the bone is cut aſunder with the Saw, then there happen very ſharp and moſt acute pains, becauſe of the *Perioſtium*, or that Membrane that encompaſſeth the bones; which pain if any would avoid, then of neceſſity he muſt make the Inciſion with the Saw in that part wherein the ſaid Membrane it ſelf is dead: which if he ſhould do, without all doubt even there likewiſe the bone it ſelf is corrupted, and there would be ſo great a putridneſs left remaining in the Veſſels, and in the Muſcles (which are very apt & ready to receive the ſaid putridneſs) that it cannot poſſibly be afterwards all of it extinguiſhed, no not with the Cautery it ſelf. Neither do thoſe Cauteries themſelves take away all that is corrupt without much pain; of which there ought indeed many to be applied and adminiſtred, if all the dead fleſh that there remaineth be to be taken away. And moreover, Cauteries have likewiſe in them theſe inconveniencies, that by their vehement heat they melt the fat and the humors; and they ſo vehemently heat the parts, that thereupon in thoſe parts that have their ſenſe and feeling there is an extraordinary pain excited; and the fleſh for the moſt part is ſo conſu-

consumed by the force of the Fire, and withall contracted, and wrinkled, that a great part of the bone sticks forth naked and bare, which very often requireth a new Section. The Hemorrhage likewise is not so greatly to be feared. For if the Vessels be intercepted by Ligatures (as we shall shew you) there wil not then flow forth much of the blood. And if the blood should chance to flow forth in somwhat a greater abundance then ordinary, yet this would make rather for the benefit of the sick Person, then be any waies prejudicial and hurtful unto him. For by this means the blood in the Vessels that haply hath received some putridness, is evacuated; and so by this means al the danger is taken away and prevented, lest that the putridness should creep any broader, and by spreading it self any further should again prevail and get strength.

That we may therefore briefly declare unto you after what manner the said Section ought to be performed, Universals (if the malady wil admit of any respite and delay) are not to be neglected; and especially there is a due regard to be had to the strength of the Patient. Let the sick Person therefore first of all eat a potcht Egg with a piece of Bread toasted, and throughly soaked in Wine; and let him be strengthened with Perfumes, Epithems, and other Cordial medicaments. Some there are that before they set upon the Section do prescribe some kind of Narcotick Medicament, to dull and stupefie the Sense: but *Fallopius* much blameth these; for (as he saith) gentle and sleight stupefiers benefit little or nothing; and as for those that are strong, they are very dangerous. After this, the sick Person being fitly placed, and held fast by the standers by, or (if need be) fastned by tying, and the Muscles being drawn upwards towards the sound part, upon that part in which the section ought to be made the Member is most strictly and very hard to be tied down with Ligatures. By which binding, first of all the overgreat flux of blood is prevented; secondly, the sense of the part (by the shutting up of the Animal Spirits) is somwhat dulled; and thirdly, the Muscles that are by this means drawn upwards (the Section being ended, and the bands loosned) do again devolve and move downward, that they may cover the extream and naked parts of the bones.

The place of Amputation

As concerning the place of Amputation; in the Fingers, and Toes, the Section is most fitly made in the very Joynt. For in the Joynt (if at least the Malady will admit thereof) the Amputation is made with the least danger, and likewise with the least pain. For the Nerves and the Tendons so soon as they are cut assunder they are instantly contracted upwards, and covered with flesh, neither doth there follow any Convulsion hereupon. But if in the Feet the Sphacelus transcend the Ankle, then the Leg is to be cut off a little below the Knee; so that the Patient may be the better fitted and accommodated with a wooden Leg. For which cause (in the Leg) the amputation is not alwaies to be made in that part that is neerest unto the dead part, but there is oftentimes also much of the sound part to be amputated. For if much of the Leg be left, this wil be very burdensome unto the sick Person, and a great impediment to him in his motion. But then on the Contrary, in the Arm, as little as may be of the sound part is to be amputated; but the Section ought to be instituted as neer as may be unto the corrupted part.

And therefore when we have made choyce of the most convenient place, then with a very sharp Razor the Section is to be made even unto the very Bone; and if it may be done, the very *Periostium* is likewise to be cut in sunder; and if there be any smal portion of the flesh left behind, or if there be any of the flesh hid betwixt two Bones (lest it should afterwards hinder that Section that is made with the Saw) that flesh is likewise to be cut off with a Knife that is fit for the purpose. And then instantly, and with as much speed as possibly may be, the Bone is to be amputated with the Saw, unless the Section be in the Joynt; for the nthe Member may be amputated with the Razor alone. The amputation of the Member being finished, the next thing to be done is the stopping of the flux of blood, after that it hath flown forth sufficiently. Most Practitioners burn the Vessels with a Cautery. But *Paræus* much disliketh this course; for he conceiveth it indeed to be very cruel and barbarous, in regard that it causeth an extraordinary great pain, if the Section be made (as it ought to be) in the quick and live flesh; and very bad and dangerous Symptoms happen unto the Nervous parts: unto which we may add that by the said burning very much of the sound flesh is consumed, whereupon the bones are left bare, and the flesh, together with the Cicatrice, either it is not at all brought over the naked part; or if it be, it is not without much difficulty. And therefore he Practiseth another way of stanching the Hemorrhage; to wit, with a Crows-bil he laieth hold upon the Vessels, and draweth them altogether, & then bindeth them as close as may be. The Vessels being thus straitly tied together with a Ligature; or (if you judg this more) fit shut up close with a Cautery; the bonds are then to be loosened, and the courser part of Flax or Hemp (we call it Hurds) after it hath been throughly soaked in the White of an Egg, and sufficiently besprinkled with a Pouder that hath in it a virtue and faculty of stanching the blood, is to be laid upon the Member. And yet nevertheleles for the most part, without any such Ligature or Cautery, the blood may likewise be stopped and stanched after this manner; As,

Take *the finest Flour three ounces, Dragons blood, Frankincense, Aloes, of each two drams;*

Bole,

Bole armenick, Terra Sigillata, Paraet or Plaister, of each one dram; Water Frogs prepared (though there be some that for this use and purpose do rather commend those of them that live among Trees) *one ounce; the Flix of a Hare cut very small, a thin Spunge torrefied by the Fire, of each two drams, and make a Pouder.*

Upon the Vessels likewise that pour forth blood there may very fitly be applied and laid on that Mushrom so much used by Chirurgeons to stanch blood, which they cal *Crepitus Lupi.* Others there are that make up Emplasters of Dragons blood, Bolearmenick, Terra Sigillata, and the finest Volatile flour (and the like) with Pitch. Afterwards the Trunk of the amputated Member is to be safe guarded with those Defensives, or such like, as we have above mentioned; the like unto which is this also that followeth; which is to be applied with Hurds, and Swath-bands, having been first wel and throughly soaked in Oxycrate.

Take *Bolearmenick, Terra Sigillata, Dragons blood, Mastick, Paraet, Oyl of Roses, and Oyl of Myrtle, of each one ounce; Whites of three Eggs, Vinegar as much as wil suffice, and make an Unguent.*

And this is the first dressing, or the first binding up; which is not to be loosened (in the Summer time) before the second or third day; but in the Winter, not before the fourth day at the soonest, unless in cale of urgent necessity.

And in the mean time the Member is to be placed in a direct middle posture or figure, in Pillows stuffed with the haits of Harts, or Wheaten meal. The first binding being loosened, and the first Provision taken away, again with the White of an Egg, as before, the Pouder stanching the blood is to be applied; and the extremities of the bones to be covered with a piece of the dry Liniment; and in the end the Wound to be bound up with some kind of Digestive.

And this Cure is so long to be continued, until there be now no cause of further fear that any mischief may follow upon the Hemorrhage, and that the Wound be now become Purulent. For then these Medicaments being laid aside, we are to make use of Cleansers. *Gulielmus Fabricius* commendeth this Unguent following of the Juyce of Smallage, not only for the Gangrene, but likewise for other sordid, foul, and Malignant Ulcers:

Take *the Juyce of Smallage, of Water-Germander, of Waybred or Plantane, and of Rue, of each two ounces; Honey of Roses strained one pound; boyl them to the Consistence of a Syrup: and afterwards mingle therewith the meal of Lupines, the Pouder of round Aristolochy root, of Angelica root, of Swallow-wort, and of Treacle, of each half an ounce, Aqua vitæ one ounce; make an Unguent.*

In the mean time we must do our endeavor that the Lips of the Wound may be drawn together, and afterwards that flesh may cover the bones, and may be unto them in stead of the Pillows. *Paræus* and others sew together the lips of the wound in the form of the letter X: but a Suture (which they cal the dry Suture) seemeth to be far more convenient; or else by a Glew, which is done after this manner. A Linen Cloth of a convenient figure and bigness, moistened throughly in a Glew of Astringent, Emplastick, and viscous Medicaments (such as are Bolearmenick, Dragons blood, Gum Tragacanth, Sarcocol, Mastick, the White of an Egg, and the like) is to be laid upon the place. As,

Take *Mastick, Dragons blood, Bolearmenick, Sarcocol, and the finest Volatile flour, of each half an ounce; Rosin of the Pine Tree two drams; mingle them with the White of an Egg. Of this Linen Cloth let there be made Emplasters which are to be applied unto the extremity of the Wound on both sides.*

So soon as the Emplasters are become dry, so that they begin to stick too fast unto the Skin, then we use to annex unto them little handles to hold by, of Thread twice or thrice doubled; and with them we contract the lips; and this may likewise be done in a suture that is more thin sewed.

And then at length we must do to the utmost of our endeavor, that the extremities of the bones which were hurt by the touch of the Iron and the Air may fal off. For which end, some there be that burn the utmost parts of them with a red hot Iron; yet stil taking great heed lest that the flesh, and other of the sensible parts be hurt thereby. Others make use of the Emplaster of Betony, and other Caragmatick or Fracture Medicaments. And so within thirty or fourty daies whatsoever there is of the bone corrupted wil fall off. If the flesh be luxuriant or proud (as we sometimes term it) it is then to be represled and kept under by the Pouder of Alum, and the like, and at length the Cicatrice is to be brought over it. But whereas pains do in the mean time much infest and disquiet the sick Person, and that there is cause to fear lest that Convulsions arise thereupon; the Trunk or Stump of the part that hath been cut asunder, yea and the Neck likewise, and all the Spinal Marrow is to be anoynted with those Medicaments (that are otherwise also wont to be applied unto affects of a Nervous Nature) made of Sage, Rosemary, Marjoram, Rue, Lavender, Dil, Camomile, St. Johns wort, Bayberries, the Oyl of Earth-worms, the Oyl of a Fox, Turpentine, and the like.

The Scorbutick Gangrene.

We must not here pass by in silence the Scorbutick Gangrene, touching which we have already spoken something in the third Book of our Practise, Part 5. Sect. 2. Chap. 4. Which most usually

usually beginneth about the extream part of the Foot, with black and purple spots; and a little after this there appeareth from hence a crusty and Gangrenous Ulcer, dry, and yielding forth neither the thin Excrement *Sanies*, nor yet the thicker, which we term *Pus*; and then one or other of the Toes beginneth to die, and then there appear red lines, and purple spots upon the juncture of the Foot, according to the length of the Leg. I have my self seen some examples of this Disease. But both this Gangrene and Sphacelus differ from that Gangrene and Sphacelus that are both of them wel and commonly known, and that in many things. For that Gangrene that is so wel and commonly known hath its original for the most part from Causes that are manifest and apparent; and there alwaies floweth forth of the Member that is dead in such a like Sphacelus a stinking and wateriſh humor; the Member becometh soft and putrid, and it sendeth forth from it a grievous and noysom stench, like unto that of a dead Carkas; and it creepeth much in a very short time, and most commonly it soon destroyes and kils the man that hath it. But now the Scorbutick Gangrene almost ever appeareth and invadeth the person without any manifest cause, creepeth forward but very gently and slowly, and doth not destroy the person therewith affected until after a long time: for I knew a Noble-man that lived above three months, but a certain School-Master I saw that lived above six months notwithstanding this Malady. The part affected with this Gangrene is altogether dry, so that there floweth out of it nothing at al; and when the corrupt part is taken away by the Iron, although a red flesh offer it self unto the view, yet nevertheless that same red color is withal somwhat dark and blackish; and the day following it likewise is even found to be dead also; and there is here no stink at al perceived that offendeth. And moreover, so soon as ever the Malady hath first of al seized upon one of the feet only, then presently after (without any manifest cause at al) there begin to appear in the other Leg and Foot also certain spots and blemishes of a red or purple color; and then likewise not long after this, one or other of the Toes of that Foot becometh wan and leaden colored, and in a very short time it is found to be quite dead: and at length most commonly the party (as it befel that Noble person before mentioned) being taken either with the Apoplexy, or with the Epilepsie, upon the first approach thereof dieth.

And yet notwithstanding, this Malady sometimes invadeth suddenly; to wit, when the peccant humors are by wrath, terror, or the like Cause, first disturbed, and then afterwards thrust down suddenly (and as it were in a moment) unto the Toes; and first of al to some one of them only; after the very same manner as the *Erysipelas* or *Rosa* is wont suddenly to arise: and this humor (in regard that it hath in it a very bad and destructive quality, or else hath received it from some affect of the mind) causeth that part that it seizeth upon instantly to die: and hence it is that by some this kind of Gangrene and Sphacelus is in special called *Syderatio*; whereas otherwise the Gangrene is wont in the general also to be termed *Syderatio*. Now this said humor seizeth upon the Tendons most usually; from whence there arise most terrible and intollerable pains that torment and grieve the sick person both day and night; which said Tendons, in regard that they do not so easily and soon putrefie as doth the flesh; hence it is that this Gangrene likewise creepeth on so slowly, that sometimes (unto the external view) it is a whol months space in overspreading one only joynt, and ere it seize upon another, albeit that within almost al the Tendons of the Foot are already infected: and this Malady continueth sometimes a quarter of a yeer before it kil the person, and it is seldom or never cured, in regard that this depraved humor hath insinuated it self more deep than usually into the Tendons, and therefore cannot be so easily taken away. So a certain Noble person (that had otherwise a Cacochymical and foul body, and was subject unto the *Erysipelas*) upon a fear and terror (Nature then suddenly thrusting down the vitious humors unto the little Toe) was surprised with a Gangrene, which afterwards by little and little overspread likewise al the rest of the Toes, and almost the whol Foot, with extream great pain; upon which (after the space of three months) he died.

Of this kind was that Gangrene also, with which a certain Citizen here (about thirty yeers of age) was taken in the month of *January*, 1633. He first of al complained of a pain in his left Arm, neer unto the Elbow; which he making light of, the pain descended unto his Hand; and it was presently taken with a cold Tumor or Swelling, and at length became suddenly overspread with a purple color; so that now there appeared manifest signs and tokens of mortification, and a Gangrene. Yet notwithstanding, upon the administring of fit and proper Medicaments (of which we shal speak more hereafter) his Hand had its natural color again restored unto it, and the swelling vanished away; so that there was nothing further to be seen, but only in the very tip of the little Finger the Scarf-skin appeared to be somwhat wrinkled; upon the opening of which there flowed forth a little of an humor; and the Skin underneath appeared pale, and so the very tip of the finger was taken with a Gangrene; which yet nevertheless (without any diminution of the Joynt) was cured. In the curing whereof we found this one thing wel worth our observation, that from the said finger most sharp and exquisite pains were extended into the whol Hand, insomuch that the sick person was even afraid to betake himself unto his bed; but that rest and

sleep he took was in the night time as he sate. When his finger likewise was handled by the Chirurgeons, the pains that he felt were so great, that he could not endure the least touch; the feet moreover swelled much, and his face was something more swoln than usually.

Neither indeed wil any man that is not a stranger unto what is done in the practice of Physick admire that some vitious and depraved humor by Nature her self thrust unto some Member should be able suddenly to mortifie and deaden it. Certain it is that a potential Cautery of Lye (out of which Sope is made) doth within the space of an hour, or at the utmost in two hours time, mortifie that part upon which it is imposed; whenas notwithstanding it is made only out of the Salt of Woods, and of unslaked Lime. What wonder is it therefore, that some humor of the same Nature, salt, sharp, and malignant, being now separated, & acting a part by it self from the rest, by the which it was tempered and qualified (as *Hippocrates* tels us in his Book of the Ancient Physick) should effect somewhat like unto the former.

Of all those that have been affected with the Scorbutick Gangrene (of whom I made mention before) no one ever recovered, besides that Citizen, that was taken with a Gangrene in the little Finger of his left Hand; he himself being (as I saw good cause to judg of him) a Scorbutick person. Now the Medicaments by which he was cured are these that follow.

Take *of the Apoplectick Water, and the Spirit of Juniper berries, of each two ounces; the Spirit of Wormwood, and of Cherries, of each half an ounce; Sage water, and Lavender water, of each one ounce; Mingle them.*

This Water was oftentimes prepared; with the which the affected part was washed, or else Linen Cloaths moistened therein were laid upon the part.

Take *Conserve Cochlear. two ounces and half; of Betony and Sage, of each one ounce and half; of the temperate Cordial Species, and pleres archont. of each one scruple; Rob. of Juniper two drams, Syrup of Betony one ounce, Make an Electuary.*

Take *Conser. Cochlear. three ounces, of Sage two ounces, Species Dyaxyloaloes one dram, the Candid Rinds of Citron half an ounce, Rob. Juniper, two drams; with the Syrup of Betony make an Electuary.*

Take *Oyl of Juniper berries one ounce, Oyl of Earthworms two ounces, Oyl of Flowerdeluce, one ounce; Mingle them.*

Take *the Essence of Carduus Benedictus, and of Wormwood, of each two drams; Cochlear. half an ounce, the Elixir of propriety one dram, the Spirit of Water Cresses one scruple; mingle them.*

Take *of Fennel root, and Asparagus root, of each half an ounce; Pimpernel two drams, the Herb Harts Tongue one handful; Germander, and Groundpine or Herb Ivy, and Dodder, of each half a handful; Anise and Fennel seeds, of each two drams; Juniper berries two drams and half, the Flowers of Bugloss and Liverwort, of each one pugil; Raisins cut small one ounce: boyl them in Spring Water unto seven or eight ounces: unto the straining ad of Sugar two ounces and half: And then again let it boyl once or twice, unto the Consistence of a liquid Syrup; and then add of Cinnamom water half an ounce, and mingle them.*

Take *Asparagus Roots, and Fennel Roots, of each half an ounce; Pimpernel, and Succory of each two drams and half; the Herb Maidenhair, Agrimony, Harts Tongue, Germander, of each half a handful; Anise seed, Columbines, of each two drams; Borrage, and Bugloss flowers, of each half a pugil; boyl them in a sufficient quantity of Water, unto half a pint: unto the straining add of the whitest Sugar two ounces; and again let them boyl up once or twice; and make hereof a liquid Syrup; unto which ad of Cinamom water half an ounce, and mingle them.*

Take *the Trochisques of Capars, and of Rheubarb, of each one scruple and half; Extract of Womwood, and Gentian, of each one scruple; Oyl of Cinnamom two drops; make Pils.*

Take *Trochisques of Rheubarb, Capars, Lacca, of each two scruples; Extract of Wormwood, and Gentian, of each one scruple; of Spleen-wort as much as wil suffice; and make Pills hereof.*

Take *Pills of Tartar with Scammony, and of Rheubarb, of each one scruple; Extract of the Pils Aggregative half a scruple, Oyl of Cloves one drop; with Betony water make Pils.*

Take *the Elixir of propriety, with the Juyce, one dram; Essent Cochlear. two drams, of Germander, Spleenwort, and Wormwood, of each one dram, and mingle, &c.*

Take *Lawrel leaves, Betony, Sage, and Marjoram, of each two handfuls, to wash the Hand withall.*

Take *Trochisques of Rheubarb, and Capars, of each one scruple, Extract of Succory half a dram, Centaury the less, and Carduus Benedictus, of each half a scruple; Make Pills forty five.*

Take *Leaves of Betony, Bay leaves, Marjoram, Sage, Rosemary, of each two handfuls; Flowers of Elder and Lavender, of each one handful; Stæchados of Arabia half an ounce; boyl them in Wine to foment the Hand therewith.*

Take *of the Nerve Emplaster three ounces, destilled Oyl of Sage one scruple, of Marjoram half a scruple; Mingle them, and make an Emplaster.*

Take *the Elixir of propriety two scruples, Es-*

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sent. Cochlear. and of Germander, of each two drams, of Elecampane, and Lign Aloes, of each half a scruple, Mingle them &c.

Take *the Leaves of Lawrel, and Betony, of each two handfuls; Marjoram, Sage, Organy, of each one handful; Flowers of the Arabian Stœchados half an ounce: boyl them in Wine for a fomentation of the Hand.*

Take *the opening Roots half an ounce, Agrimony half a handful, Leaves of the choyceſt Sene one ounce, Mechoacan half an ounce, Ginger one dram and half; boyl them in Spring water: in four ounces of the ſtraining diſſolve half an ounce of Manna, and then ſtrain it again, adding thereto one ounce of Sugar, and make a Syrup.*

This Cataplaſm was likewiſe made uſe of.

Take *Bean meal one ounce, Pouder of Water-Germander, Rue, Sage, Wormwood, of each half an ounce, and make a Cataplaſm.*

The little Finger with that next unto it (the Ring-finger) was oftentimes anoynted with the Oyl of Earthworms, which is made by putting the ſaid Earthworms waſhed into a Glaſs, & then encloſing the Glaſs in a Maſs of Dough, bake it in an Oven; and the Liquor that cometh from theſe baked Worms gather it together, and filtrate it.

But for the Curing of the Ulcer in the little Finger, after the Gangrene we uſed this Unguent.

Take *Oyl of Bays, Honey, Turpentine, of each two drams; May Butter, Gum Elemi, one dram: Mingle &c.*

Another Cure.

A certain Noble Perſon having had his Foot wrung with his ſhoe, in that very place where the hurt had bin there aroſe a black Puſtule in the ſole of the right Foor. Which he not much regarding, there inſtantly followed a Gangrene, which in that place ſeized upon the Fleſh. Which ſo ſoon as it was obſerved, the affected fleſh was preſently ſcarified; and the Puſtule being cut with a pair of Cizers, the Ægyptiack Unguent was impoſed upon the part affected. After this the Defenſive of *Vigo* was applied unto the Foot; which is in this manner prepared.

Take *Oyl of Roſes Omphacine, and Myrtles, of each three ounces; the Juyce of Plantane and Nightſhade, of each two ounces; boyl them to the Conſumption of the Juyces, and then ſtrain them.*

Add of white Wax one ounce and half, Meal of Lentiles, Bean meal, and Barley meal of each half an ounce; of all the Saunders, of each two drams and half; Bolearmenick one ounce, the Berries and Leaves of Myrtle, of each one dram; Mingle them, and make an Unguent, with the which let the part affected be anoynted.

Upon this Unguent there were impoſed Linen Cloaths wel wet in the Water following; and they were often renewed.

Take *Barbers Ley two Quarts, of Lupines groſſy beaten three handfuls; boyl them, until the Lupines become ſoft: let the Ley be ſtrained; and in the ſtraining diſſolve of Saffron two ſcruples; Mingle them.*

The Scarification of the place affected, and the laying on of the Ægyptiack Unguent (together with the Defenſive) was thrice repeated the firſt day: the Water that was likewiſe applied.

The day following the corrupt fleſh was cut forth, and the ſame helps and Remedies adminiſtred.

The third day the corrupted fleſh being wholly removed, the following Digeſtive was impoſed.

Take *of pure Honey two ounces, of Bean meal two drams, of Choice Myrrh half an ounce, the Whites of two Eggs, Saffron ſix grains; Mingle them, and make an Unguent.*

And together with the foregoing Unguent there was likewiſe adminiſtred the Emplaſter of *Vigo*, ſuch a one as this:

Take *Bean meal, the Meal of the bitter Vetch Orobus, of Lentiles, of Lupines, of each four ounces; Juyce of Wormwood, ſix drams, common Salt half an ounce, Oxymel ſimplex as much as will ſuffice; boyl them over a gentle Fire, and make an Emplaſter.* The uſe of theſe Medicaments being for ſome daies continued, the ſick perſon was thereby perfectly cured.

Hitherunto touching Ulcers in general; and particularly concerning the Gangrene and Sphacelus, both that Species of them which we term Scorbutick, as alſo thoſe other that are ſo wel and commonly known. It remaineth that in the next place we ſpeak ſomething of what is oftentimes amiſs in the Skin, Hair, and Nails.

THE

THE FIFTH BOOK, THE THIRD PART.

Of the Vices of the Skin, Hair, and Nails.

Sect. I. *Of the Vices of the Skin.*

Chap. 1. *Of the color of the Skin changed, (in general) and in special touching that blackness that is contracted from the Sun.*

NATURE being very sollicitous and careful in the preservation of the health of Mans Body doth alwaies that which is for the best; and therefore she expelleth the vitious humors that are heaped up in the body from the principal Members, and the greater Vessels unto the more external parts, and the superficies of the body; from whence there arise many kinds of Tumors, Tubercles, and Pustules, as likewise divers sorts of Ulcers; as also divers kinds of spots and blemishes, and changes of the color. Whereas therefore we have already treated (in the first and second Part) of Tumors, Tubercles, Pustules, and Ulcers, (and withal made mention there of the Measles, small Pox, and certain other spots and blemishes) as there it is to be seen; we wil now handle those things that remain in this Part; and withal we wil treat of the Vices, that is to say, whatsoever is amiss in the Hairs and Nails.

The changes of the color of the Skin.

And in the first place indeed for what concerneth the Vices and blemishes of the Skin, the changes of its color are many and various. First they are Universal, and of the whol body; as in the Cachexy, Scurvy, yellow Jaundice, the white Feaver of Virgins (commonly called the Green-sickness) touching which we have elsewhere spoken. Secondly, they are particular, and of some one part of the body; as in a *Suggillation*, *Erysipelas*, *Gutta Rosacea*, *Impetigo*, *Lichen*, *Vitiligines*; touching al which we have already spoken in our handling of Tumors; as also the blackness contracted from the burning of the Sun, those spots and blemishes appearing in the faces of Women great with child; as those they cal *Ephelides* and *Lentigines*, which are spots and blemishes of a dark and reddish color, that in their color and figure do very much resemble Lentiles. And moreover likewise those spots and blemishes which are contracted from the very birth and infancy; touching which we are now to speak. And first of al, among these blemishes we wil speak somthing of that affect which they cal *Ephelius*, that is to say, heat-wheals, or smal hard pushes in the face. Where notwithstanding we must give you to understand (as a little before wetold you likewise) that many of the Tubercles, Spots, and Blemishes of this kind, although they are now with us commonly and generally wel known; yet nevertheless by what names these like Affects were called by the Ancients is not so wel and sufficiently known. And this appeareth even out of *Celsus*, who in his sixth Book, and Chap. 5. thus writeth: *The regarding of these* Vari *or Pimples*, Lenticulæ *or Freckles, and* Ephelides, *so as to cure them, is but a meer folly and foppery* (saith he) *but yet nevertheless it is likewise a thing altogether impossible to take from Women the care they have of the beauty and handsomness of their faces. Now then, of those that we mentioned before, the* Vari *and* Lenticulæ *are commonly known; although that species be somwhat more rare which the Greeks cal* Phacos, *since that kind is a* Lenticula *somwhat more red, and more unequal. But as for the* Ephelis, *the most are generally ignorant, as not wel knowing what it is; it being indeed nothing else but a certain roughness, and an hardness of an ill color. The rest of them are to be found no where in the body, but only in the face; but the* Lenticulæ *are wont likewise to arise and appear in some other part.* And I am altogether of opinion, that even out very ordinary Women are sufficiently acquainted with these Affects; which said Affects notwithstanding, viz. *Vari*, *Lenticulæ*, and *Ephelides*, what Affects they were with the Ancients is not sufficiently manifest. If the *Ephelis* that *Galen* mentioneth in his seventh Book of the faculty of simple Medicaments be written by the Greek Letter ν, then without all doubt it hath its name from the Sun, so that they are certain spots contracted from the Sun. But *Celsus* (unless it be an error and mistake of the book) writeth the word with the Greek ε, *Ephelis*, and saith that it is a roughness and hardness of an evil color; which wel agreeth not with those spots. *Eustachius Rudius* (in his second Tract, second Book, and Chap. 4. of the Affects of the external parts) saith that the Greeks *Ephelis* is *Panus*; and that *Panus* indeed may infect any part whatsoever

soever of the body, especially the Groyns, the Abdomen, the Back, the Neck, and the middle Region of the Breast: but for the most part nevertheless (as he writeth) it defileth the very Forehead it self. But in regard that *Celsus* reckons up the *Ephelis* among those Affects that never appear but in the Face, we have therefore determined above (in the first Part, and 29. Chapter) that those broad spots that appear about the Groyns, Breast, Abdomen, Back, and Neck, and dye the said parts with a certain kind of duskishness, that is one while somwhat greenish, and another while somthing reddish, and as soon again of a color inclining to black (and which are generally wel known) are more fitly to be referred unto the *Alphus Niger* or the black *Alphus*. And he (the aforesaid *Rudius*) doth likewise ill in calling the *Ephelis* by the name of *Panus*; and his determining that *Ephelis* and *Panus* are one and the same Affect, is altogether false: since that out of *Celsus* his fifth Book, Chap. 18. *Pliny* his twenty fourth Book, Chap. 4, & 9. and likewise from other Physitians it is very cleer, that *Panus* is the Greeks *Phygethlon*; and that somtimes likewise *Phymata* are comprehended under the name of *Panus*. But there are some others also, that neglecting the Authority of the Ancients, cal those spots in the Face, especially in Women, by the name of *Pani*. *Hippocrates* in his Book of Women that bear not Children, page 245. (in *Foesius* his Book) writeth that this kind of spots is called *Ephelis*; when he saith, That *those women that are with child if they have a spot in their Face, as it were from the Suns burning, for the most part bear female Children.* Where for the most part is wel added, in regard that it is often observed also that Women great with Child, which have born Males, have had their Faces defiled with these kind of spots; so that these spots may rather be said to be a sign and token of the Conception in general, than particularly of the Sex that is conceived, whether it be Male or Female: Whence it is, that the Germans likewise cal it *Kinds flecken.*

But now, whereas there is a twofold *Ephelis*, one from causes external, another from internal Causes; of the latter of these we intend to treat in the Chapter following, but of the former we wil speak in this present Chapter. And indeed the first kind of these *Ephelides* is that wel known Affect, to wit, that blackness (which the Germans cal *Sommerbradt*) in the Face, the Hands, and those other parts that are exposed unto the Sunbeams, contracted from the heat of the Sun. And as wel men as women are subject unto this affect; but yet nevertheless more especially women, as having their Skin more tender, and chiefly in the Spring time. For whereas in the Winter the Face was not accustomed to much heat, if in the Spring it be suddenly exposed unto the Sunbeams, the Skin that before was white now beginneth to wax red with a certain kind of blackness.

Blackness from the Sun.

The Affect is of it self known from the Cause foregoing. And the Face is not only deformed with some certain spots, but the whol color thereof is changed.

Preservation from it.

But now this burning and blackness from the Sun may be prevented, if the Suns Beams be turned away from the Face by Shades and other Coverings, and the Hands kept covered with Gloves; or both the Face and Hands anointed with the white of an Egg, shaken together with Rose-water, or with the Mucilage of the Seeds of Quinces, or of Fleawort extracted with Rose-water, or Gum Tragacanth dissolved in Rose-water; or else let the face be anointed with the Emulsion of the four greater cold seeds, or let it be anointed with this Unguent.

Take *Unguent Pomatum two drams*; *Cerus dissolved in Rose-water one dram*; *Mastick half a dram*; *the Mucilage of the seeds of Fleawort one ounce*: *Make hereof a Liniment.*

And of these kind of Medicaments there is need most especially in the Spring time, when the tender Face can very hardly be sufficiently guarded from the heat of the Sun, and of the Air.

The Cure.

But if the Face be already as it were burnt, and a blackness be contracted, Nature indeed of her own accord is wont in process of time to change this deformity (when it draweth a new Scarf-skin upon the burnt place) if in the mean time the Face be covered from the Beams of the Sun. But these delaies being for the most part tedious unto women, they must in al haste have their pristine color again restored unto them by the help of Medicaments. And commonly women are wont to cleanse their Faces with the Leaves of the Cherry Tree while they are yet fresh and green. Others of them there are that use Rose-water wherein Camphyre hath been dissolved; and others of them make use likewise of the Cherry-tree Gum dissolved in Vinegar, whereunto they put a little Oat-meal.

And here likewise there is much use made of the Water of Bean flowers, of Mallows, and white Lilies: and those that are made of the four greater cold seeds destilled with Milk. Bitter Almonds are also here very useful. Or,

Take *the juyce of Plantane, and of Nightshade, of each one ounce*: *Litharge of Gold, and of Silver, of each one dram*: *burnt Lead half an ounce*: *Tutty prepared six drams*: *Camphyre half a dram*: *Oyl of Roses and Wax as much as wil suffice, and make an Unguent.*

Take *Roots of white Lilies rosted under the Embers two drams*: *the Root of the Herb Dragon-wort, and Solomons Seal, and Melons seed, of each two drams*: *the Mucilage of Fleawort seed one ounce*: *of the Citrine Unguent half an ounce, and make an Unguent according to art.*

CHAP.

Chap. 2. *Of the* Ephelides *in Women with Child.*

THere is another kind of these *Ephelides* that happeneth more especially unto Women with Child; and it hath its original from the Menstruous blood retained; which (in regard that for the most part from the said retention it contracteth a great deal of viciousness) is wont to excite in Women great with Child divers symptoms, as likewise these spots in the Face bred from a vitious humor thrust forth thither.

But now and then notwithstanding Virgins and Women that are not with Child have these kind of spots breaking forth in their Faces, if in the time of their monthly Menstruous flux they eat those kind of meats that (as they say) have in them a power of coloring; such as are the Carrot Roots, and the red Beets, and the like, which (as we are taught by Experience) do breed and bring forth these kind of Spots.

Signs Diagnostick.

These *Ephelides* in Women with Child are known, in that they are dark and duskish spots, appearing more especially in the Forehead, and deforming it, and spreading themselves both in length and breadth; and oftentimes they equal in length the palm of the hand, but they are void of al kind of roughness.

The Prognostick.

The *Ephelides* in Women are a sign of their Conception, (as we told you before out of *Hippocrates* his Tract of Women that never have Children) and they are seldom or never cured; and if haply they be taken away yet they soon return again, and with some they continue even unto the time of their Delivery, and after that they vanish, and in some they likewise continue after their Delivery; and in some others they also vanish before they are delivered (when the Child is now become strong and vigorous) like as do other symptoms that usually infest Women with Child in the beginning of their Conception.

The Cure.

Indeed it is very requisite that the depraved humors (that are the Antecedent Cause of this Affect, and are wont to nourish the same) should be evacuated; but in regard that in Women with Child we may not safely make use of those evacuations, we ought therefore to content our selves with Topical Medicaments. And here there is to be commended the use of Bayberries, if their rinds be taken off, and then they be beaten into a pouder, and so mingled with Honey, and made into the form of an Unguent, and the Face therewith anointed in a Bath. Or,

Take *Pouder of Lawrel Berries as much as you please, and with Mushrom Water make it into the form of a Pultis, with which let the Face be anointed in the Bath.* Or,

Take *Camphyre one dram; Nitre two drams; Mingle them with Honey, and let the Face be anointed with the said mixture.*

The Emulsion likewise that is made of the Seeds of Hemp is very useful.

For the spots that are in the Faces of Maidens while their Courses are upon them, and whilst they yet flow,

Take *the Juyce that is pressed forth of the root of Bugloss sliced, and with it anoint the Spots.*

Chap. 3. *Of* Lentigines, *Pimples, or Specks in the Face.*

AND hither belong likewise the *Lentigines*, which the Germans (from the color of dry Leaves) cal *Sommer strossen, Sommer flecken*, and *Lauf flecken*; and they are spots in color resembling Lentiles, with the which (in Women especially) the Face principally, and somtimes likewise the Hands, Arms, and upper part of the Thorax being exposed unto the Air is aspersed and overspread, they somtimes standing thicker, and somtimes thinner, like unto so many drops, as it were, without any pain and trouble; in some appearing indeed only in the Summer time, and vanishing again in the Winter; and in some likewise they keep their course from yeer to yeer.

The Causes.

But now they have their original from adust burnt blood seizing upon the Scarf-skin. And this happeneth more especially in ruddy bodies, that are of a Cholerick temperature, and especially in the Summer time when that vapor of the blood is more burnt. And hence it is that in the Winter for the most part these spots vanish, but then they return again and appear in the Summer. And they break forth chiefly in those parts that are exposed unto the external Ambient Air, the Face, the Neck, the Hands, and the superior part of the Thorax, because that the Scarf-skin is more burnt by the Sun, and the Ambient Air detaineth those burnt vapors in the Skin. *Platerus* is of opinion, that the Juyce that should nourish the hairs that are fixed in the Skin, being brought unto the pores of the Skin do cause these spots. For this humor (saith he) being first of al assimilated by them, and agreeing somwhat with them in color before they are put unto the Roots of them, if it be by them further dispersed any whither else into the superficies and circumference of the pores, it then produceth those kind of spots, and that dark and duskish color, somwhat (more or less) inclining unto that color of the hairs that it had gotten

gotten while it was assimilated by them. Which diffusion of this Juyce into the Pores proceedeth sometimes from the external heat overstrongly attracting it, and withall dilating the Pores, if then the Juyce nourishing the Hairs doth not only affix it self unto the roots of the Hairs, but diffusing it self further also, and there subsisting, causeth those Dusk, Dark, and Brown spots, more or less, according to the diversity of the colour of the Skin. But since that the Face wanteth Hairs, it is not credible that the Juyce ordained by Nature for the nourishing of the Hair should breed such kind of spots: but for the breeding of these like spots there sufficeth a portion of the adust blood, degenerating as it were into a Melancholly humor. *Platerus* also is of opinion that the overgreat Natural loosness of the Pores contributeth its furtherance, so that even by reason of them the said Juyce doth not only nourish the Hairs, but likewise produce these spots. But I had here rather assent with *Eustachius Rudius*, who thinketh rather that the *Lentigines* do arise from the thickness of the Skin, and therefore because that the Cheeks are more thin than other parts, therefore it is that although there come into them very many of these adust vapors, yet notwithstanding they are not detained in them, but are from thence gently evaporated; and so the *Lentigines* that are in them are but few: but because the Skin of the Fore-head is thicker, and that the vapors are not easily received in it, but being once received are the more detained there, therefore the Fore-heed doth the more abound with these *Lentigines* or Dusky spots.

Signs Diagnostick.

These *Lentigines* are easily known; because that they are Spots of the bigness a of Lentile, of a dark, brown, and dusky color, dispersed up and down in many drops as it were, standing close and thick together, and very familiar unto such as are of a red Hair; and they annoy the Face, the Neck, the Hands, and those parts that are exposed unto the Sun and the Air.

The Prognostick.

Those *Lentigines* as they have in them no danger at all, so for the most part they vanish in the Winter: but yet notwithstanding in some bodies they alwaies return again in the Summer; and in some they are Annual, and return constantly from yeer to yeer.

The Cure.

Galen for these Spots commendeth the Herb Costmary with Honey and Water, as also the seed of the Cabbage. Bitter Almonds are likewise very useful, and so is the Oyl of Eggs likewise. But most effectual is the Water of great Figwort, distilled out of that wel known Plant: as also the Water drawn out of the flowers of the spotted Satyrion; and lastly the Oyl of Tartar by draining. O,

Take *of Eldern flowers, and Bean flowers, of each a like proportion: pour in unto them Goats Milk blood-warm. Let them stand for a daies time in some cold place; and afterwards let them be destilled: and then,* Take *Bean meal as much as you think fit; let it be moistened with the said water, and in the evening let the Face be anoynted with that mixture.*

In the morning let the Face be washed with the water of Elder flowers, and Bean flowers; unto which there may be added a little Camphyre dissolved in the Spirit of Wine. Or,

Take *Honey four ounces, Oyl of sweet Almonds one ounce, Pouder of the Flowerdeluce root two drams, Borax half an ounce; make an Unguent.*

The Virgins Milk likewise (as it is called) is here very good; and it is thus prepared.

Take *of Litharge four ounces; boyl it in three pints of the best Vinegar, unto the wasting of a third part; when it is cooled, let it be strained through a filtring bag; and afterwards,*

Take *Sal Gem three drams; boyl it in cleer water unto the Consumption of a third part; then strain it: after this,*

Take *of this Water two parts, and of the former Vinegar one part; and mingle them.* Or,

Take *the Citron Unguent new made three ounces, of sweet Almonds throughly bruised, and Bean meal, of each one dram; the bone of the Sepia-fish, Harts horn, and Barley meal, of each two drams; let them be incorporated with Honey and then wel mingled together.* Or,

Take *the fresh flowers of Beans as many as you think fit; pour unto them a sufficient quantity of Goats Milk: let them stand infusing a day and a night. Afterwards let them be strained, and squeezed hard; and into the straining let new flowers be thrown in, and so let them stand infusing again for the space of a day and a night, and then let them be strained: this must be five times repeated. And then add of the soft pith of new Bread as much as wil suffice, that it may be made like unto a Pultise; and then adding thereto a little Goats Milk, destil them: With this Water let the Face be washed in the morning and evening.*

There are certain things likewise very usefull, that shall be propounded in the following Chapter.

Chap. 4. *Of Cosmetical, or Beautifying Medicaments.*

BUt yet although we have hitherto in the precedent Chapters spoken touching the taking away of divers of these Skin-spots; Women notwithstanding (that study little else but their beauty) are not herewith contented; but they

reftleſsly purſue after thoſe things that procure unto their Faces a luſtre and amiableneſs. For their ſakes therefore we wil add ſomthing alſo even of theſe Coſmetick or beautifying Medicaments. Now theſe Medicaments are of two ſorts; ſome of them do only mend the obſolete, dark, and blackiſh colour of the Face, and render the Skin ſomewhat more bright and cleer; (and theſe are by no means to be diſallowed of; ſince that they only reſtore unto Man or Woman that beauty which either by the injury of the Air, or by any other Cauſe, they have loſt and been deprived of; and withall do truly and really produce a fair and ſtable colour; and theſe are called Coſmetick or beautifying Medicaments:) but others there are that are only Palliative, and theſe we call Face-fucuſſes, becauſe that unto the Natural colour there is likewiſe added an adventitious and acquired white or red colour; and this is ſo painted on that continueth it for a while, and but for a while only, and deceiveth the Eyes of the Beholders. We ſhal ſpeak of the former ſort of Medicaments alone. But as for the latter ſort of theſe Medicaments, in regard that we judge it neither honeſt nor pious to make uſe of them, we wil therefore ſay nothing at all of them, but paſs them over in ſilence. But now as for what concerneth the former of theſe Medicaments, it ſeemeth altogether a thing unreaſonable to reject them, in regard that they bring over the Face no *Fucus*, or counterfeit painted beauty, but they only reſtore the Natural whiteneſs of the body, loſt upon any Cauſe whatſoever. And this is more eſpecially allowed unto Women; who becauſe that they are in Wiſdom, ſtrength of Body, Fortitude, and in ſome certain other things, much inferior unto Men, therefore in ſtead (of theſe as the Poet *Anacreon* tels us)

Nature on Women doth beſtow
A Comely form, and Beauteous hiew:
Inſtead of Lances, Targets, Shields,
Their Face a fair bright luſtre yields:
Which puts on Women ſuch a Grace,
That Fire and Sword to them give place.

And *Plato* (in his Phædrus) ſaith, *That of all things whatſoever Beauty is the moſt excellent and Amiable*, and there he calleth a Beautifull Face, a *Divine Face*, that is to ſay, *a Face ſhining forth by reaſon of a kind form that is put upon it.* But the other is altogether to be rejected by Women; and St. *Cyprian* writeth very truly, in theſe words of his (in his ſecond Tract, of the Habit of Virgins) *We ought not only* (ſaith he) *to admoniſh Virgins, or Widows; but I conceive, that even Married Women and all others whatſoever (in general) are to be admoniſhed, that the Handiwork and Image of God ought by no means to be adulterated, by adding thereto any yellow color, or any black Powder, or any kind of redneſs, or (in a word) any other Medicine that corrupteth the Native Lineaments.* And a little after; *They lay wicked hands* (ſaith he) *upon the Work of God, when as they go about to transfigure and reform that which he himſelf hath formed, as not knowing that all whatſoever is made and wrought is the work of God, but whatſoever is Changed is the work of the Devil.*

Now the Medicaments of the former ſort are ſuch as (almoſt all of them) do very much ſcour and cleanſe, by ſeparating from the Skin that Juyce that deformeth the ſame with this brown and duskiſh color, and by alluring thereto a new Juyce that may procure unto it a bright and beautiful color. Unto which there are ſomtimes added likewiſe certain Emollients, which have in them a power to ſoften the Skin when it is hard, thick, and rough; they alſo make it ſmoother, and more eſpecially they cauſe an extraordinary ſoftneſs in the Hands.

Milk wil ſatisfie both theſe ſcopes, and eſpecially Aſſes Milk, and Goats Milk: Which *Poppæa* the Wife of the Emperor *Nero* being not ignorant of (a Woman extreamly proud and luxurious) ſhe cauſed five hundred Milch Aſſes alwaies to attend her whitherſoever ſhe went; and in a great Tub made purpoſely for her to bathe in, ſhe waſhed her whole body in the ſaid Milk, that ſo it might be all over freed from wrinkles, made tender and delicate, and preſerved white; as *Pliny* relateth the ſtory in his eleventh Book, Chap. 41. and Book 28. Chap. 12.

Cleanſers are theſe; *the Roots of the greater Dragon-wort, Solomons Seal, great Figwort, wild Cucumber, white Lilies, the Elder, bitter Almonds, Pines, the four greater cold Seeds, French or Kidney Beans, Rice, Bean meal, the Meal of Cicers, of Lupines, Starch, the White of an Egg, Milk, Camphyre, Salt, Oyl of Tartar, Frankincenſe, Myrrh, the Crumbs of white Bread, the Oyly Nut Ben.*

Of the Roots of Dragon-wort there is a certain Gerſa made; which is nothing elſe but the Dregs or Lees thereof, as they commonly cal them.

And ſo alſo there may in the like manner be prepared ſuch a like *Fæcula* or *Gerſa*, out of the Roots of Solomons Seal, and great Figwort. And out of the Oyly Nut Ben (commonly called Balanus Myrepſica) there is an Oyl preſſed forth, that is called the Oyl of Been.

And likewiſe out of divers of theſe ſimples together that erewhile we mentioned there are made many deſtilled Waters, and divers Compoſitions. As,

Take *Root of Solomons Seal, Dragon-wort, great Figwort, of each one ounce and half; of the Flowerdeluce one ounce, of Bean flower two ounces, Maſtick one ounce, Borax two drams; let them be deſtilled.*

Take *the ſoft Crumb of White Bread three pound*

pound thereof, the Whites of Eggs wel shaken together, twelve in number; Goats Milk two quarts; let them be destilled. Or,

Take *Rice one pound, let it be steeped in the Water of Bean flowers, untill it break; afterwards add of choyce Mastick six drams, Borax two drams; and then destil them.* Or,

Take *the Pith or Crumb of White Bread one pound, Root of Solomons Seal half a pound, Goats Milk as much as wil suffice; and let them be destilled.* Or,

Take *Flowers of the Elder, and of Bean flowers, of each a like proportion; pour hereunto Goats Milk, and strain it; let them stand in a cold place for eight daies; and then destill them.* When you use the Water,

Take *of Beans hulled, beat them into a very fine Pouder, and cast the same into the said Water, and after this let the Face be washed with this Water, and permitted to dry leisurely of it self. In the end dissolve Camphyre in the Spirit of Wine, and mingle it with Eldern Water; and let the Face be washed with this Water.* Or,

Take *Whites of Eggs, in number twenty four; Cinamom two drams, Asses Milk or Goats milk, two Quarts, and destill them.*

Emulsions likewise made of the four greater Cold Seeds, bitter Almonds, and Pines, are here very useful.

There are also Decoctions made (with which the Face is to be washed) of Beans, Cicers, Lupines, Rice. Or,

Take *Roots of white Lilies, Solomons Seal, Borrage, of each one ounce, Mallows, Sope-wort, Parietary or Pellitory of the Wall, and Violets, of each two pugils; Beans hulled one handfull, Flowers of Mallows half a handful; make a Decoction, with which let the Face be washed.*

Liniments moreover and Unguents are made use of, among which are the *Pomacea* or *Pomata*, as they are commonly called. The Oyl of Talck is now adaies much in the mouths of many; and very much used in the Nurseries of great Women. But this last seemeth rather to belong unto the Face-fucusses then unto the true Cosmeticks, unless it be administred only to cleanse; and after the use thereof (when they go abroad in publick) washed off from the Face.

Medicaments that whiten the Hand.

But now the more Choice and delicate Women (that are unaccustomed to labor) do not only administer certain Medicaments unto their Faces, but unto their Hands likewise, that so they may become soft and white; and these Medicaments are made of the Crumb of White Bread, the Meal of Barley, of Cicers, of Lupines, and Honey, all which being wel wrought together with Water, or else mingled with soft Sope and Honey, they wash their Hands therewith. Or,

Take *Meal of Cicers, of Beans, of sweet Almonds, of each two ounces; the Roots of Flowerdeluce of Florence two drams; Honey and Rosewater of each as much as wil suffice; and Mingle them.*

And here likewise the Pomatum Unguent is of much use.

Or else such a Sope may be made;

Take *of Venice Sope one pound; let it be dissolved in Rose-water; add thereunto the Pouder of Flowerdeluce of Florence one ounce, the Meal of Cicers one ounce and half; and mingle them.*

There are likewise many other Medicaments (which we mentioned a little above) for the making of the Face fair and clear; and they are here also very useful.

Many other things there are of this Nature, that we may see in *Rondeletius*, in his Tract of Fucusses.

Of Mending and Beautifying foul and deformed Cicatrices.

What things they be that amend the deformed Cicatrice.

The rectifying and amending of deformed Cicatrices is not unfitly referred unto the Cosmetick or Beautifying Medicaments. For when as upon the Solution of continuity (either by reason of a Wound or an Ulcer) there is from the Juyce nourishing the Skin (for the uniting of the part) something generated that is like unto the Skin, and stiled by the name of a Cicatrice; this said Cicatrice is indeed like unto the whole skin; and yet it is oftentimes differenced from it in colour, and many times likewise in figure; because that somtimes it becometh more high and raised, and otherwhiles it is depressed & kept low, and leaveth as it were a pit, and so consequently a certain inequality or unevenness, and thereby breedeth a deformity; which in the progress of time is wont to be somewhat changed, whileſt that the Cicatrice is rendered day by day more like stil unto the Skin. Which if yet nevertheless we have a desire that it may be speedily effected, it may then be done by some certain Medicaments; such as are, first the Oyl of Myrrh, which is made if the Yelk be taken out of an Egg hard boyled, and then the Egg filled up with Myrrh, and put into a moist place, until it be all dissolved into a Liquor; and this likewise may be wrought by the destilled Oyl of Myrrh. The moisture also that sweateth forth of Eggs whiles they are in rosting is very useful for this purpose. The Oyl likewise of the Yelks of Eggs, the Fat of the Thymallus Fish, which they commonly call *Ascia*; the Oyl that is pressed forth of the Kernels of Peaches, Oyl of bitter Almonds, and Oyl of Been. Or else an Unguent may be made of Borax, Camphyre, and Mans fat, or of Litharge, and the Oyl of Roses, and the Oyl of bitter Almonds

mingled with Honey; or else an Unguent may be made of the Juyce or Root of wild Cucumber and Honey; and with this the Cicatrice may be anointed for one day, but the day following with Milk; and this by turns from day to day must for a while be continued. Or,

Take *the Mucilage of Fenugreek seed, and of Fleawort, of each two drams; Oyl of Tartar by straining half an ounce; Oyl of Roses one ounce; Cerus, and Borax, of each one dram, and mingle them.* Or,

Take *the Root of Dragon-wort, of Solomons Seal, of each two drams; Bitter Almonds, Peach Kernels, of each one dram; Egg-shels burnt half a dram; Frankincense and choyce Myrrh, of each one dram; Sugar Candy three drams; the Mucilage of Fenugreek seed one ounce; Oyl of the Yelks of Eggs, and Mans fat, of each as much as wil suffice: Mingle and make a Liniment.*

But if the Cicatrice be deep, it is not so to be amended by Medicaments that it may be made equal and even with the rest of the Skin; but the Cicatrice is by Section, or else by some corroding Medicament to be taken away; and the Cavity (as much as is requisite) is to be filled up with flesh, and afterwards a new Cicatrice is to be brought al over the part.

Cicatrices after the smal Pox and Measles.

But most of al after the smal pox and Meazles there are oftentimes very frequently left behind (in the Face) unsightly and deformed Cicatrices, that cause an exceeding great eye-sore and il-favorednes; and thereupon (that they may be amended) the help and assistance of the Physitians is oftentimes implored.

But for the taking away of these Cicatrices, those Medicaments that we a little before mentioned are very useful; and so are those likewise that have been prescribed before in this present Chapter, for the making of the Face more fair and clear. And for this (out of al these) there is more especially commended the fat of the precious Fish *Thymallus* or the *Ascia* fish.

Forestus had happy succes in the use of this that followeth:

Take *Oyl of sweet Almonds an ounce and half: of white Lilies one ounce: the Fat of a Capon, and Goats Fat, of each half an ounce: Sarcocol half a dram: the pouder of Bryony root, and Flowerdeluce, of each one scruple: Sugar thabergat one dram. Bruise what is to be bruised into a very fine pouder, and pass them through a very fine sieve, and then (if you so please) add thereto dissolved Gums, and at length let them be mingled together in a Mortar, pouring thereupon Rose-water, the Water of white Lilies, and of Beans, of each a sufficient quantity; continually stirring them, and incorporating them together; then let them by the stroking of the Hands be passed through a woollen Cloth, and there wil run forth a soft Unguent.*

Chap. 5. *Of those they cal Mother Spots, or Blemishes.*

THere is also another sort of Blemishes that is wont to defile and deform the Skin, and this is derived from the very first original, and that which the Infant hath contracted even in the Mothers Womb; and hereupon they are called Maternal, and original Blemishes, Spots, and Marks. Now these Spots are very various and different, sometimes of a red color, and as soon again of a dark and brown color, and oftentimes of neither of these two, but of some other color; and it is also of this or that shape and figure; and somtimes in this, somtimes in that part of the body.

The Causes.

There are some indeed that believe that these spots and blemishes are excited in the body from a fortuitous and accidental concourse of the humors. But the very truth is that such like things come not to pass by chance; but Experience it self teacheth us, that these spots depend upon the fancy and imagination of the Mother, and that by it the Infant is thus marked as they speak. There is no necessity for our heaping up of the several Authorities both of Philosophers and Physitians, as touching this subject; neither is it requisite here to recount even al the faults and things amiss in the conformation, that are caused by occasion of the imagination. For it is wel enough known unto al kind of Women, that Infants have now and then had some certain spots resembling Straw-berries, or Cherries; or else red spots like unto red Wine, or the Fire; whenas upon the sight of such like objects by the Mother, the Imagination maketh an Impression of these like colors upon the Child. And I my self knew a woman great with Child, who standing under a Mulberry Tree, there fel some of the Mulberries upon her back; whereupon the Infant that she went withal had as many excrescences in its back, resembling the shape and figure of Mulberries. But now, how it cometh to pass that the Imagination doth this, I have at large shewn you in my Tract touching the Consent and Agreement of the Chymists with *Aristotle* and the *Galenists*, Chap. 14. and in the fourth Book of our Practice, Part 2. Sect. 4. Chap. 7. Which here to repeat I hold it altogether needless.

Prognosticks.

1. This kind of Spots is very hard to Cure: and although it seem sometimes to be a little obscured, yet it soon breaketh forth again, in a manner as if it were raw; and some there are that relate how that those spots that are contracted by the occasion of Cherries, Strawberries, and Grapes,

(at

(at the time when theſe Fruits are wont to be ripe) wil appear, and as it were flouriſh again.

2. If yet notwithſtanding there be Medicaments adminiſtred immediately upon the birth of the Child, they are ſomtimes taken away.

The Cure.

Women do commonly make uſe of the blood of the Secundine or Afterbirth for the taking away of theſe Spots; rubbing and cleanſing the ſaid Spots therewith while it is yet hot. And others likewiſe afterward make uſe of the Menſtruous blood.

There are yet notwithſtanding other cleanſing Medicaments likewiſe (of the which we have hitherunto ſpoken, and preſcribed for the taking away of other Face-ſpots) that may here be made uſe of: others adminiſter the Mothers faſting ſpittle: and others require the often inſtilling of the Milk that is drawn out of the Mothers Breaſts upon the ſaid ſpots and deformities. Which if they ſuffice not, then we are to have recourſe unto corroding and Cauſtick Medicaments alſo, or unto the Manual operation, and the ſhaving of the Scarf-skin likewiſe. It is alſo good for the Mother in the morning (for ſome certain daies continually) to chew Muſtard ſeed, and with it to rub the ſpot. And ſome there are that preſerve that part of the Infants Navel that falleth off after the due knitting thereof, and this being dried, and afterwards moiſtened in the Water of the Herb Chriſtopher they lay it upon the Spot thrice a day, ſo long until the ſaid ſpot be wholly vaniſhed. There is here likewiſe commended the deſtilled Water of Mountain Avens, if the Infant (ſo ſoon as it cometh forth of the Womb) be waſhed therewith; and the ſpots afterwards waſhed with the ſame Water.

Chap. 6. *Of the Volatick or flitting ſpots of Infants.*

THe German Practical Books (as we may ſee in the Practice of *Gabelchomerus*, and in the Phyſical Diſpenſatory of *Wittichius*, and in others) make mention (among Childrens Diſeaſes) of a certain Affect that they cal *Denflug*, which in regard that I never ſaw it, I have therefore omitted, & not at al ſpoken of it in my Tract of Infants Diſeaſes. But becauſe there are ſome that write that they have ſeen it, we wil therefore make mention thereof here in this place. Now theſe deſcribe this Affect, that they are certain flitting ſpots, of a red or purple color, creeping up and down here and there in the Skin; which if they touch upon any orifice (as ſuppoſe, the Mouth, the Noſtrils, the Eyes, and the Ears) and penetrate ſo far as that they reach even unto them, the Malady is then mortal. And therefore that they may prevent this, they take Roſe-water, and mingle therewith a little Saffron, and with this they anoint al the ſaid Orifices (and the Spots themſelves likewiſe) round about. Only they do not anoint the body towards the Feet, that ſo by the Feet theſe ſpots may vaniſh. Which ſpots (if any ſuch there be) without al doubt they are a ſpecies of the *Eryſipelas*, and therefore we are not only to adminiſter that Liniment unto the orifices of the body, but we are likewiſe to make uſe of thoſe Expulſive Medicaments alſo that are otherwiſe wont to be uſed in the *Eryſipelas*.

Chap. 7. *Of thoſe ſpots and blemiſhes that the Germans cal Hepatick, or Liver-ſpots.*

AS I have often told you (and cannot but here again acquaint you with it) there are many kinds of Tubercles and Spots (and theſe are alſo at this day very commonly known every where in al Nations) which by what names they were called by the Greeks or Latines we know not; whenas yet notwithſtanding it is no way credible that there were no ſuch Affects as theſe among the Ancients; for there were then riſe in thoſe times the ſame cauſes as now.

The Affect Leberflecke *what it is.*

There is commonly known an Affect which the Germans cal *Leberflecke*, without al doubt, in regard they beleeve that it hath its original from the Liver, to wit, dark and browniſh ſpots, or ſuch as of yellow become ſomwhat blackiſh, as broad as the Palm of the Hand, ſeizing upon the Groyns eſpecially, and the Breaſt, and the Back, yea and ſomtimes alſo covering the whol Breaſt with a certain ſleight roughneſs of the Skin that ſendeth forth as it were ſcales, or branny ſcurf; which yet notwithſtanding do not ſtick and abide in one place alone, but are diſperſed hither and thither; and one while they vaniſh, another while they break out and appear again. *Reinerus Solenander* (of al that I can remember) doth moſt plainly and cleerly deſcribe unto us theſe ſpots, in his Sect. 5. Conſultat. 11. but yet he gives them no name. And *Platerus* likewiſe ſeemeth to make mention of theſe, when he writeth, that there are ſome certain dark, browniſh, and dun ſpots, as broad as the palm of the hand, ariſing ſomtimes in ſome certain parts of the body, and at ſome certain times only, and vaniſhing alſo at ſome certain ſeaſons. But he maketh the matter ſomwhat obſcure and doubtful, in bidding us to ſeek for the cauſe, and for the Cure in the *Lentigo*. For theſe *Lentigines*, and the ſpots we now ſpeak of are different Affects, and they have different Cauſes; as wil further appear from thoſe things that have been already ſpoken of before in the third Chapter, touching the *Lentigines*, and ſhal be more

more fully spoken of in this present Chapter. Whether these kind of spots may not be referred unto the *Vitiligo*, and the black *Alphus* (as I think that they wel may) I leave it unto the judgment of the Reader. Our purpose is here in this Chapter to explain and treat of this Subject, without either the Greek or Latine name; for the German name is of al others the best known, as are also the very spots themselves.

The Causes.

The Cause of these Spots is a humor very dry and Melancholy brought unto the Skin, together with the aliment of the parts; or else blood that is feculent, ful of dregs, and very thick; which when it cannot al of it be assimilated, that of it that is excrementitious is thrust forth unto the Skin. But although that more feculent blood may be generated from an overdry Liver; (from whence it is that by the Germans it is called *Leberflecke*, that is to say, Liver-spots:) yet nevertheless, seeing that the Liver doth its office in its sanguifying faculty, and breedeth good blood, the Spleen without doubt is not altogether free from fault. Whereupon I have observed that after those spots (if they have continued long) Quartan Feavers have arisen. An unfit kind of Diet, and such a course of life as is apt to breed a thick and feculent blood, and a Melancholy humor, maketh very much likewise for the generation of these spots; touching which we have already spoken elsewhere.

Prognosticks.

1. These very spots indeed have in themselves little or no danger; neither do they breed any kind of trouble, or any deformity visible unto the eye, when they arise in the Face and Hands, as the *Lentigines*, but in those places that are covered with Clothes.

2. And yet notwithstanding, in regard of the Cause upon which they depend, and the vitious Constitution of the Liver, and Spleen, they presage other Diseases: and very frequently Tertian and Quartan Feavers follow these Spots.

3. Although those Spots may easily be taken away (as anon we shal shew you) yet nevertheless, unless the fault and imperfection of the blood and bowels (from which the vitious blood is generated) be taken away, they again return and flourish in a short time after.

The Cure.

Since therefore these kind of Spots being taken away may again return, unless the Cause upon which they depend be likewise taken away, the vitious humor is therefore to be evacuated by Medicaments that are made of the Roots of Polypody, Succory, Borrage, Spleenwort, Dodder, Maidenhair, Egrimony, the Leaves of Sene, Rheubarb, Jalap. And this is sometimes to be repeated: and if there be occasion, a Vein may likewise be opened.

But then in regard that these Purgers do evacuate only those humors that are collected in the Veins, but do not prevent the generation of the said humors; we must therefore more especially do the utmost of our endeavor that the vitious Constitution of the Liver and Spleen (upon which the breeding of these humors doth depend) may be amended: and this may be performed by a good and wholsom dyet, by the which that dry constitution of the Liver and Spleen may by degrees be restored unto a better condition. And therfore we are to prescribe Meats of a good Juyce, such as Goats flesh, Veal, Lamb, Pullets, Eggs, and the like, Barley, Wheat, Apples throughly ripe,, Prunes, Raisins, Almonds. But the Patient must avoid meats that are thick, salt, & sharp, and generally al meats of an il juyce, such as are flesh that is smoke-dried, and the like. For the Constitution of the Bowels being by the use of good meats reduced unto a better estate and condition, the vitious humors wil no more be generated, but only a good and temperate blood.

But as for what concerneth Topicks; it wil be very good in the morning to rub those parts that are thus defiled and deformed with spots. But first of al, before the Patients going into the Bath, it wil not be amiss to take the Water, or the Syrup of Fumitory, with a little Treacle. After his sweat let the place be anointed with Mustard seed with warm water reduced into the form of a Pultis; which may be there left to continue so long, even until that a heat and a certain pricking be felt and perceived in the part; and afterward let it be washed with warm Water. Or else let it be anointed with this Mass.

Take *White Sope half a pound, let it be sliced and dried; and afterwards add of Mustard seed one dram and half; the meal of Beans and Lupines, of each two ounces; the soft Crumb of white Bread one ounce; with the juyce of Fumitory, or the sharp-pointed Dock, mingle, and use it.*

Chap. 8. *Of the Itch.*

Although that the Itch may be joyned together with many other Affects, as Scabs, the *Impetigo*, Leprosie, and the like; so that these being taken away, this very Affect is likewise removed; yet notwithstanding it sometimes singly and alone vexeth and troubleth persons; and so troublesom it is, that the party thus affected is often enforced to implore the help and assistance even of the Physitian also; and of this we intend to treat here in this Chapter.

Now the Itch is a pain that is excited from a thin and sharp excrement sticking between the Scarf-skin and the Skin it self. For albeit while the place of the Itch be scratched, there is perceived

ved a certain seeming pleasure; yet nevertheless this pleasure doth not belong to the Nature of the Itch, but it followeth only upon the scratching, whilst that the parts that were gnawn by a sharp matter do suddenly return unto their natural state, and their wonted smoothness. For like as there is a pain excited from that sudden motion unto a preternatural state; so in like manner there is a certain pleasure felt from this sudden motion and return unto their Natural state. Now the truth is, the Itch it self ceaseth after scratching, because that the matter which was the cause of the Itching is evacuated; and because also that the solution of Continuity that exciteth the pain, is again brought unto an Union and quietness, if the scratching be any thing strong.

The Causes.

The neereft cause of the Itch is a salt Excrement that is biting and sharp; to wit, either meer pure Choler, or else black Choler, commonly called Melancholy; or else a salt flegm. Which excrement albeit that it be present also in the scabby Affect, yet in the Itch it is more thin, and insinuateth it self through the least particles. But it sticks between the true skin and the scarf-skin, and thereupon by its acrimony it goadeth (as I may so say) and pricketh the sensible particles in the skin, and provoketh them unto scratching. And indeed like as the Nature of the excrement it self maketh much for the sticking of the said Excrement in the Skin (this Excrement although it be thin, yet having in it a certain kind of clamminess and glewishness, by the which it sticketh very close and pertinaciously unto the parts;) so doth likewise the thickness of the skin it self, by reason of which it cannot exhale.

But now that excrement is collected by reason of the heat and driness of the Liver, the use of sharp meats, and many Spices. And hence it is that old men (those especially of them that in their youth had a hot Liver, and such of them as then used a hot kind of Diet in their meat and drink) are in their old age so sensible of the Itch, and at length come to be troubled with scabbiness. See further hereof in *Galen* his second Book of the Causes of Symptoms, and the sixth Chapter.

The Differences.

Now according to the variety of the humor, and the nature of the places affected, there is a certain difference likewise of the Itch. For look how the matter is more or less sharp, so the Itch that is excited is more or less contumacious and troublesom. And sometimes there is felt an itching in the skin of the whol body; and sometimes in some parts only.

Prognosticks.

1. The Itch is for the most part the forerunner of Scabbiness shortly to follow. For if the Itch be of any long continuance, there is then at the length collected a greater abundance of the matter; and this receiving a putridness is rendered more sharp, and it corrodeth the Scarf-kin, and exciteth Pustules.

2. By how much the worse the humor is that exciteth the Itch, by so much the worse is the malady also. To wit, the Itch that is excited from burnt blood, or Choler, is sooner ended and gone: but that which proceedeth from salt flegm lasteth longer; and longest of al that which hath its original from burnt Melancholy.

3. The Itch in which there is great pleasure taken in the scratching thereof, is evil, because that it ariseth from a sharp Choler.

4. The Itch in old people is seldom cured, especially in those that are decrepit. For since that old age is fit for the treasuring up of these salt humors, that disposition of the body is hardly changed, and brought unto a better state. And yet notwithstanding if diligence and care be shewn, it is sometimes healed. And *Mercurialis* (in his Tract of the Diseases of the skin, Chap. 3.) relateth that *Leonellus Pius* (a man fourscore yeers old) was freed from an extraordinary great Itch by the benefit of Medicaments.

5. *Hippocrates* (in *Coacis*) writeth that the Itch in those that have Consumptions (if it succeed the suppression and binding of the Belly) is not only dangerous, but deadly. For by reason of the trouble and disquiet of the Itch, those in Consumptions can neither sleep, nor take any rest; whereupon there is little or no Concoction, and therefore they have their death hastened upon them.

The Cure.

The Itch (seeing that it is a pain) if it be extraordinary great and vehement, and cause watchfulness, thereby decaying the strength, sheweth that mitigation by Anodynes is to be procured; but the Cause that it dependeth upon calleth for evacuation. And indeed the next Cause (since that it is a sals humor sticking in the Skin) this is likewise to be evacuated from the Skin. And in regard that this said next cause is nourished by a like humor contained in the Veins, therefore this is likewise to be evacuated. And because that this humor is generated from a distemper, and vitious disposition of the Bowels, it is therefore to be anointed: and so the generating of such like humors is to be prevented.

Those Moisteners take away the Itch that mitigate the sharp matter that is the Cause of the Itch. Now those things that evacuate these excrementitious humors from the Skin, are those Medicaments that Cleanse, Mollifie, and make thin. Purgers take away the Antecedent Cause. Alterers amend the vitious disposition of the Bowels; but more especially a good course of Diet.

And

And therfore in the firſt place the Salt, Nitrous, and ſharp humor is to be prepared and evacuated. The humor is prepared by ſuch Medicaments as have in them a power of Cooling and Moiſtening; and ſuch as withall attenuate the Thick Clammy humor; ſuch as are Succory, Endive, Borrage, Bugloſs, Fumitory, Hops, Maidenhair, Aſparagus Roots, Polypody, Mother of Time, and Syrups made out of theſe; and more eſpecially that of Hops, Fumitory, Succory, the Byzantine Syrup, and the Syrup of Maidenhair.

Now the Humors are evacuated by the Leaves of Sene, Polypody, black Hellebor, Jalap, the compound Syrup of Polypody, the Electuary Diacatholicon, Confection of Hamech, Extract of black Hellebor, the Melanagoge Extract. The forms of theſe are elſewhere propounded, and ſo they are alſo in the Chapter of the Scabs.

And ſometimes alſo Veneſection (if the Age and ſtrength wil bear it) is to be inſticured: and becauſe that it often falleth out, that either the Hæmorrhoids, or the Courſes ſuppreſſed and kept it may afford matter and occaſion unto this Evil; it wil therefore not be amiſs to provoke and draw forth theſe Hæmorrhoids, or Courſes.

But for the tempering and allaying the heat of theſe Aduſt humors, as alſo of the Bowels themſelves, there is nothing that doth it ſooner then the Whey of Goats Milk; which may be given from one pint to three. But it wil be better for uſe if there be added ſome Juyce or Syrup of Fumitory. But that which more eſpecially correcteth the diſtemper of the Bowels, and maketh for the generating of good blood, is a fit and proper Courſe of Diet. Let the Air be temperate, inclining unto cold and moiſt: and the Meats of a good Juyce, of an eaſie Concoction, and that are not eaſily corrupted, theſe may be altered with Borrage, Endive, and eſpecially Lettice; which laſt procureth alſo ſleep which in this Affect is very requiſite and uſeful. But all ſuch meats as are Sharp, Salt, Bitter, Sour, Sweet, Fat, and moſt of all fried meats, are to be ſhunned and avoided.

As touching Topicks, for the mitigating, and moderating of the Itch it ſelf, and for the tempering of the humors Acrimony, and likewiſe for diſcuſſing of the humors, a Bath of ſweet Water made blood-warm is of ſingular uſe; in the which the ſick Perſon may ſit for half an hour (or a whole hour) in the morning faſting; becauſe that it doth at once temper the heat and drineſs of the Bowels, and withall rarefie the Pores. But the Medicinal Baths (to wit, thoſe of Sulphur, &c.) are more uſeful in the ſtronger diſcuſſing of the matter; and it wil not be amiſs (by turns) one while to make uſe of a Bath of ſweet blood-warm Water, and another while of that that is ſalt and ſulphury. For ſo by this means both the Itch ſhal be mitigated, the Pores looſned, and the excrements in the Skin Cleanſed away and evacuated. But for diſcuſſion we may likewiſe make uſe of either common Oyl, or Oyl of ſweet Almonds with Salt and Sulphur; as alſo *Oleum Coſtinum*, or Oyl of bitter Coſtus. Or elſe the body may be waſhed with the Decoction of Smallage, Parietary, the ſharp Dock root, the Seed of the bitter Vetch Orobus, Lupines, White Cicers, Bran. Or,

Take *Lupine meal three ounces, Sulphur two ounces; mingle them with Vinegar, and anoynt the body therewith.* Or,

Take *Litharge, Sulphur, Turpentine, of each one ounce and half; the Juyce of Mallows, and Parietary, of each one ounce; Oyl of Cinnamom as much as you think fit, and mingle them.*

But then after the uſe of ſuch like things as have been mentioned, the ſick Perſon muſt make uſe of a blood-warm Bath of ſweet Water.

More hereof may be ſeen in the firſt Part, Chap. 27. touching Scabbineſs; ſince that moſt of thoſe Medicaments that Cure the Scabs, and eſpecially the dry Scabbineſs, they are likewiſe uſeful in the Itch.

Chap. 9. *Of the ill and offenſive Smell.*

AND laſtly, among the Affects of the Skin, we muſt not paſs over in ſilence that ſtinking and offenſive ſmel that is ſometimes wont to breathe forth out of the external parts of the body through the Skin; and to be very offenſive, not only to the By-ſtanders, but unto the Perſon himſelf alſo, whoſoever he be that is troubled therewith. For the body of man, whiles it continueth in its right ſtate ſmelleth not at all, neither doth it ſend forth any ſavor that may by any one be perceived. For every living Creature (whatever it be) doth breathe forth ſome kind of Smel proper unto its own kind, as *Theophraſtus* teacheth us in his Book of Smels; and this he proveth by experience; by which we ſee that Dogs find out and follow their Maſters foot-ſteps, by the help they have from this ſmel; and wild Beaſts likewiſe do the ſame in ſeeking their Prey. But yet nevertheleſs if any ſmel ſhal be perceived to come from any one, this is a thing that is preternatural, as being beyond and beſides Natures Intent. And as for what *Plutarch* writeth (in the life of *Alexander* the Great) that the body of the ſaid *Alexander* ſent forth a ſweet and pleaſant ſmell, this is a thing very rare; unleſs haply it come more from the Cloaths, then the body.

But that ill and ſtinking ſmels do oftentimes proceed from Mans body, is a thing wel known by frequent obſervation. Now the places from whence the offenſive ſmel cometh, are the Mouth, the Arm-pits, the Privy Parts, but more eſpecial-

ly

ly the Feet. But that the Ears and the Nosethrils likewise do sometimes stink, this proceedeth from the Ulcers that are in them. Yet sometimes notwithstanding, there exhaleth forth a stinking & offensive smel even out of the whole body of him that is thus affected: as for the stink of the Mouth, we have already spoken thereof, in Book 2. Part 1. Chap. 19.

But now it is not our Intent, here (in the general) to dispute of the Nature of smels, what it is, and likewise by what means the sweet or unsavory smel is generated; in regard this may be known from Philosophical and Physical Discourses. In this place it is sufficient that we know, that this offensive smel and stink proceedeth from a superfluous humidity putrefying, and exhaling such a like vapor.

Hircus The stinking smel of the Arm-pits is called *Hircus*. *Avicen* (*Septima quinti*, Tract. 3. Chap. 23.) tels us, That there are some who assert that the Remainders of the Seed that were superfluous in Generation, and brought into this place, are the cause of this stinking and offensive smel. Which Opinion although that *Avicen* rejecteth it, and that by others the cause of this smel is said to be the astriction of the pores of the Skin in that place, by reason of which the vapors cannot freely breathe through and exhale: yet notwithstanding, this constriction or shutting up of the Pores is not sufficient; for if it were so, then this Affect should be most familiar unto old people. And this opinion albeit thus rejected by *Avicen*, doth not in any thing seem to be absurd. For we know well that this Affect is most familiar unto Virgins that are marriageable, if at any time they grow hot with motion. And that the Testicles, and the Seed have in them a full power of imprinting such an offensive and stinking smel upon the blood, we may sufficiently know it from Goats, and other living Creatures that are gelded. Yet nevertheless this feat smel is most especially familiar unto those that have very moist bodies, because that moisture is most obnoxious unto putridness. For although that all the blood do not putrefie, yet notwithstanding about the Emunctories the excrementitious vapors are apt and very ready to receive the putridness.

The offensive smel of the privy parts in some. And for the very same cause the privy parts of many yieldeth the like offensive strong smel, by reason of excrementitious humors, which from the Liver and the Veins are thrust forth unto the Emunctories that are seated in the Groyns, from which stinking vapors do exhale.

Stinking Feet. The Feet likewise of some have a very feat and strong smel, and may truly be said to stink. For whereas Nature is wont to thrust forth the excrementitious humors unto these external parts, the Feet being so covered and shod that the vapors exhaling from them cannot freely expire and breathe forth, they then and there receive a putridness, and from thence that stink is contracted. And lastly (but this is very rare) the whole body stinketh (unless this smell arise from sweat, as most frequently it doth) and that strong Feat smel (stinking you may cal it) that is sometimes ascribed unto the whol body, is properly the smel of the Arm-pits. And yet notwithstanding *Martial* (as we find it extant in his sixth Book) hath this Epigram upon *Thais*.

Thais *stinks worse than Fullers Pot ere stunk that lay*
Fur'd up to th' brim, but newly burst, in th' midst of th' way:
Worse then the lustful Goat new come from's Mate ere stank;
Worse then the Dogs skin flay'd beyond great Tibers *bank:*
Worse then th' Abortive Chick that's found in rotten Eggs;
Worse then the Tankard marr'd with Corrupt Sauce, and Dreggs.
This Cheat to damp her poysonous stink with sweet Perfumes,
Whenas she's stript, and takes the Bath, she then assumes
Psilothra, *Perfumes, Oyntments, or lies hid with Chalk,*
And thus by shifts she keeps her stink from common Talk.
When sh' hath us'd all her thousand Arts, and thinks all wel,
Yet stil she stinks, and Thais *doth like* Thais *smel.*

Prognosticks.

1. This strong and stinking smel is loathsom, and very offensive to the Standers by, and such as is very unfit for Conversing with others; and it oftentimes rendereth the Wife unacceptable and unpleasing in the Eyes of her Husband.

2. And yet notwithstanding this stinking smel is a sure sign of an overmoist Body, and a Body wherein there are many moist Excrements heaped; and this the body is very easily obnoxious unto in Fevers and other Diseases arising from putridness.

The Cure.

The Cure respecteth either the stink it self (that may be palliated and covered by a sweet smel) or the very cause of it; and this is the true Cure. And therefore the bodies of them that are thus troubled, are in a convenient manner, by Venesection (if need require) and Purgation to be evacuated, and its overgreat humidity to be dried up. And here more especially there is commend-

ed Aloes Rosate, which drieth the body, and powerfully preserveth it from putridness.

Let the Diet likewise be so ordered that it may tend toward drineſs, and resist putridness. And therefore let his Meats be sauced with Vinegar, the juyce of citrons, & oranges, Rose-water, & Rose vinegar. But there must be an abstinence from meats that are easily corrupted; such as are Cucumbers, Melons, Musk Melons, Figs, and the like. The overmuch use of Fish, especially the softer sort thereof likewise to be avoided. The Exercises of the body let them also not be neglected: neither let the sleep be excessive. Afterward we are wel to take notice from what part the stink exhaleth, and accordingly that part is to be cleansed and washed with the Decoction of Barley, Scabious, Flowerdeluce Root, Aloes, Myrrh, Guajacum wood, Citron Rind, Saunders, Asplalathus or Thorny bush; and after this a Cerote is to be imposed of Styrax Calamite, Benzoin, Cinnamom, Cloves, Myrrh, and Aloes, incorporated, and made into a mash with Rosin, and the Oyl of Lavender.

But seeing that (before such time also as the Cause be quite taken away) the said stink is troublesom and offensive unto al persons that come neer; it may therefore be obscured by sweet smels, and thereby be both depressed and palliated. The Arm-pits therefore and the Groyns (as there shal be need) may be anointed with some sweet smelling Liniment or Unguent) made of the Flowerdeluce Root of Florence, Cinnamom, Lign Aloes, Cloves, Gallia Moschata, Styrax Calamite, Oyl of Lavender, or Balsam of the Citron, Cloves, Cinnamom, or many of these mingled together, adding thereto Musk, and Ambar, if it seem good unto you so to do. Under the Arm-pits there may likewise be born sweet scented bals, or an Ambar Pomander. The said stinking and offensive smel is easily taken away, if the Feet be every day washed with Water or Ley, in which Bay Leaves, the Leaves of Organy, and Sage, the flowers of Rosemary, Roses, Camomile, and Flowerdeluce root are boyled; or else the Feet may be washed in Wine in which Allum hath been dissolved.

After the washing we may likewise administer those Remedies that the Greeks cal *Diapasmata*; which (as *Pliny* writeth in his 13. B. chap. 2.) consist of odoriferous things that are dry; and they are the sprinklings of some dry Medicament that is made into a fine pouder; with the which we are to rub the Feet, and to sprinkle some thereof betwixt the Toes. As,

Take *Bay Leaves, and Organy, of each one ounce; Flowers of red Roses, the Florentine Flowerdeluce Root, and Cypress root, of each half an ounce; Bean meal, and Lupine meal, of each two ounces; Salt dried one ounce: Make a Pouder.*

The same course is to be taken if the whol body send forth a stinking smel. And then frequent use must be made of Baths of the sweet smelling Herbs a little before mentioned. And if the said offensive stink cannot otherwise be obscured and palliated, we are then to make use of perfumed Garments, sweet Bals, Balsams, and the like. But it is better to take away the Cause of the offensive smel, than to go about by sweet scents and perfumes to obscure and palliate it; since that perfumes unless they be very strong, they mingle themselves with the stink, and are but as it were a vehicle unto it, and so cause the smel to be the more unsavory. Whereas the truth is, that he that smels of nothing at al, smels best of al.

There is extant in the Physical Epistles of that famous Physitian *Georgius Horstius*, Book 2. Sect. 10. a very memorable History of a stinking and offensive smel proceeding from the whol body: where Dr. *Sigismund Snitzerus* writeth unto Dr. *Andreas Libavius*, that a certain Augustane Virgin (seventeen yeers of age) was sent unto *Bamberg*, and there put into the Monastery of the holy Sepulchre, that so she might live as a Recluse and Nun of the said Order. And that she was no sooner entered into that Monastery, but she sent forth a stinking smel (not unlike unto that of a dead putrefying Carcass) greatly offensive and displeasing unto the rest of the Nuns; whether she kept them company in their common meeting place, or else kept her self close and mew'd up in her own Cell; for even here also they smelt her as they passed by: but a diligent enquiry and search being made into the cause thereof, he came (as he writeth) at length to understand that this stink of hers proceeded not from any thing amiss in her Mouth, Stomach, Womb, or any other particular part of the Body, but from the general habit, temper, and constitution of the whol body. Yet nevertheless *Libavius* (in his Epistle wherein he returneth an answer) doth not admit of this said proper Constitution and temperament of the whol Body; in regard that to render the reason thereof, is beyond the reach and power of any man living; but he rather thinks that something happening from without brought upon her that alteration of her substance, and so caused this offensive smel. And he conceiveth indeed, that this distemper was contracted in the Womb from the pollution of the blood, and the corrupted seed; and that it did consist and was nourished in the Womb of the Mother: or that this Maiden (being then but an *Embryo* in the Womb of the Mother, while it yet lay therein) suffered something from the nauseousness and vomiting of the Mother, and from affrightment befalling her, or from some grievous Affect that she lay under. He conceiveth moreover, that the Mother might be affrighted and terrified upon the sight of some Sepulchre, or that she happened to come in place where they were anointing some dead body; or that she took conceit, and a loathing from the putrid and stinking Excrements that

flow

flow from such as lie in child-bed; or else that she was some way or other greatly affected by these and the like accidents. You may read more hereof in the alleadged Epistle of *Libavius*.

And another Example of the stink of the whol body the same *Libavius* hath in the following Epistle, where he writeth, that he wel knew a certain yong woman, that after she was married, and living in Wedlock, (while she had her Courses) had such a stink coming from her, as never Jakes had worse; and that during this time her Husband lived very discontentedly, as one much afflicted therewith.

THE FIFTH BOOK, THE THIRD PART.

Sect. II.

Of things amiss in the Hair and Nails.

Chap. 1. *Of the Nature of the Hairs.*

AFter the faults of the Skin, we wil (and that not unfitly) subjoyn those things that are amiss in the Hair. For the Hair is fixed in the Skin; neither is it any where else to be found but in the Skin. Neither indeed are the Vices of the Hair to be passed over in silence, in regard that even these are (although ignoble, yet) parts of the body. For as no man can wel deny, That the Nails, the Hoofs, and Horns of al living Creatures, and likewise that the Feathers in Birds are parts of their body; and that none can wel say that a Peacocks Tail, and al the various Feathers in Birds that are of so many several colors; I say, as none can wel affirm that these Feathers affording so great variety are a thing meerly excrementitious, and not parts of their body: so likewise it is in no wise to be denied, that the Hairs are also a part of the body. And this we are sufficiently taught by the conformation of them, by their various figure, and their different colors. The same is likewise proved by the use of them, and so also by their diseases; touching which we shal speak hereafter; and especially that we cal *Plica Polonica*. And lastly, That very effective and conformative power that the Hair hath as wel as other parts, (as we shal by and by shew you) cleerly demonstrateth the truth of this. And the growing of the Hairs again after their being cut, doth not in the least prove that they therefore are no parts. For both the Nails, and the Hoofs, the Claws of Lobsters, and in certain bruit Beasts the Horns, after they are shed and fallen off, yet they grow forth again; and so do likewise the Teeth in Men and Women.

We are indeed vulgarly (but erroneously) taught, That Hairs are generated when from the heat of our bodies fuliginous and thick vapors are out of the third Concoction elevated in the parts of our body, and are driven unto the pores of the Skin; in the streight passages whereof whiles they stick, they are there conglutinated; until at the length the pore being filled up, other vapors coming underneath drive it forward; and these vapors are likewise followed close by other vapors, and after them by more, and so in the end they are thrust forth out of the pore, and the hair is formed; which afterward (the like vapors succeeding, and thrusting forth the hair) and agglutinating themselves unto the root thereof is thence cometh to be prolonged.

The breeding of the Hair.

But now if the Hair should be generated in this manner, a reason could not then be given why hair should not alike be bred in al parts of the body; and in those parts where they are bred, why there should be in some places more store thereof, in some less; and why some of them are alwaies growing, when others grow not at al. In the Neck and Face there grow no hairs naturally, but in the Head and Cheeks there are great abundance of them; as also in the privy Parts, in the Armpits, Eyelids, and above the Eyelids on the Eye-brows. The hair in the head and beard is ever growing, and is continually lengthened out; but those hairs that are in the Eyelids ever keep at one and the same length, and moreover they evermore remain straight. And furthermore no cause could at al be given, wherefore men only should have Beards, and that women should not likewise have them; whenas notwithstanding women have on their heads most usually the longer hair. Moreover, the hair is by *Aristotle* (in his third Book of the History of living Creatures, Chap. 12.) distinguished into that wch is bred toegther with us (such as is the hair of the head, eyelids, & eyebrows) and that that is afterwards bred, to wit, such as at length ariseth in process of time as age comes on: of which there could no cause at al be rendered, if (according to the vulgar opinion) the hairs had their original out of those vapors that break forth.

And therefore there is some other cause of the hairs original to be sought for; in the discovery of which *Galen* hath also been very curious, and taken great pains; insomuch that he here taketh occasion (which otherwise he doth but very seldom) to make mention of the wisdom, power, and goodness of Almighty God, the Author and Framer of al things; and he hath here endeavored to examine his Omnipotency and Wisdom in this particular, and to confute *Moses*, as we may see in his eleventh Book of the use of the Parts, Chap. 14.

But if we seriously weigh the matter, we cannot by any means grant that the hairs are bred only from the excrements, or the vapors exhaling out of the body, and sticking in some certain places; but we are rather to determine that they are generated from the formative (we may term it the pilifique or hair-breeding) faculty, for the causes a little before mentioned. And that the hairs are generated, not only from some kind of fuliginous vapors, but from a matter that is far more solid, and neerly allied unto the matter of the Nails, and Horns, we are taught even by this, that the hairs are not easily corrupted, but are (even after death) preserved a long while whol and entire. Touching which *Gabriel de Zerbis* relateth a History (in his Book of the Anatomy of Mans Body, in the Title of the Anatomy of the Hair, fol. 15.) in these very words: *At* Rome *we both saw and touched* (saith he) *the dead body of a Woman buried in the way called* Appia *(just opposite unto the way where* Cicero *was buried: and therefore it was the conjecture of the most, that this Carcass was the dead body of* Tulliola *the dearly beloved Daughter of the said* Cicero, *as it might be understood by the Inscription: this Carcass was taken out of the Grave, wherein by means of great store of Myrrh, and some Mummy likewise, it is believed that it had been preserved from corruption, from the time of* Cicero, *even unto the time of Pope* Sixtus *the fourth; being neer upon one thousand five hundred yeers. In this Carcass there was good store of Hair, adorned, and tied up with a Golden Fillet; as it was then the Custom to bury those of her age. This Carcass (having been also generally viewed by sundry Spectators, and almost by al the people as wel as by my self) was from thence removed and brought to* Rome, *where in three daies time (the means that preserved it being now far distant from it) it putrefied, and was soon resolved into its first principles, and became mingled with the Earthy Element wherein it lay.* And so altogether in the same manner, like as the Nails in Men and Women, the hoofs and horns in four-footed Beasts, the painted and variously colored Feathers in Birds are produced by the Formative faculty; and if they chance to fal off they are again renewed in the same manner; even so likewise the hairs are generated by the formative or pilifick faculty that is by the Creator implanted in some certain parts; and hence also it is that there oftentimes ariseth such a great variety of colors in the hair. For (as we have already said) the hair in the head and beard is from day to day augmented and lengthened; but it is not so in the hair that is in the Eyelids and Eyebrows, which for the most part evermore keepeth at one and the same length. Moreover the hairs in the Eyelids stand alwaies straight forward; and if either their length be increased, or their straightness incurvated, they then hinder the sight, and cause an inconvenience. Men have beards, Women have none: the Creator, to wit, having altogether destined these hairs unto a certain use; and therefore he hath given this pilifique or hair-breeding faculty unto some parts, and not unto other some; which said faculty formeth the hairs, for their certain quantity, figure, and color. In Man-kind and Animals there groweth no hair under the feet; the Hare alone excepted, which (as *Aristotle* testifieth in the third Book of his History of living Creatures, Chap. 12.) hath hair growing under the feet. And this moreover arguеth that the hair in Animals proceedeth from the formative faculty; to wit, for that by the strength and force of Imagination the form and color of the hair may be changed, as out of the 30. Chapter of *Genesis*, in the History of *Jacob* sufficiently appeareth.

The matter of the Hair.

The matter of the Hair (as of al other parts of the body) is the blood, as likewise *Adrianus Spigelius* (in his fift Book of the Fabrick of Mans Body, Chap. 10.) hath determined; and this also appeareth plainly in the Affect we cal *Plica Polonica*, in the which if the hairs be cut, there issueth blood out of them; but this blood is of the meaner and more ignoble sort. For Nature doth the part, and discharged the office of a good and provident Houſ-keeper, (distributing unto each particular person in the Family what properly belongeth unto him) and with the best and purest part of the blood she nourisheth the more noble and worthy parts of the body, distributing the residue unto the ignoble and less principal parts, to wit, into the Nails and Hairs in Man-kind; and in Bruits, into the Hairs, Hoofs, Horns, and Feathers: of which we have already likewise spoken, in the third Book of our Institutions, Part 1. Sect. 2. Chap. 3. But although it be true that the Hairs proceed from the more ignoble part of the blood, yet notwithstanding it is unctuous, and (if we may so speak with the Chymists) very Oyly, and Sulphureous as it were (as appeareth by the burning of them) as having I know not what kind of neer alliance with the seed; and from hence it is that such as are lustful and salacious are likewise hairy; and those on the other side that are not inclined unto Venery are smooth and without hair; and hence it is that Eunuchs

and

and effeminate Persons produce no Beard; and those that are excessive and immoderate in the use of *Venus* are soon bald; and on the contrary, Eunuchs are never bald.

The use of the Hair.

From al which we may likewise easily collect what the use of the Hair is. For certain it is that they have their peculiar and proper uses; since that the Hairs on the Head are (as it were) the Natural Covering thereof; the Hairs in the Eye-lids do after their manner conduce unto and further the sight; and when they are pulled forth or fall off of themselves, it much prejudiceth and hindereth the sight; the Hair of the Head, and the Beard, in men especially, serves as a great ornament unto Man, and they render him more venerable (as it were) in the account of others. But now in regard that the Hair under the Arm-pits, in the privy parts, and in the Thighs, is given us by Nature neither for a Covering, nor yet for an ornament, therefore we may conclude that Nature in the production of these Hairs sought some further end, and intended some other use; to wit, that hereby in the generating of these Hairs the more ignoble part of the blood may be consumed: from whence likewise it is, that in some they grow forth and appear more abundantly, and in others more sparingly; as Infants also are (in most parts of their body) altogether void of Hair; which notwithstanding are afterwards generated in them as they encrease in yeers, the matter of the Hair being more and more heaped up together.

Chap. 11. *Of things amiss in the Hair; and first, of Baldness and want of a Beard.*

AND therefore, since that the Hairs are generated from the formative or Hair-breeding faculty, they have their Natural Constitution, which consisteth in their Natural magnitude, and store, figure and color; which said Constitution when once it is lost, they are then subject unto many different Vices; which if you please to call Diseases, I wil not gainsay you. And indeed the first Vice is in the defect of them; and this is either Natural, & such as happeneth unto very many according to their age; or else it is preternatural. The first of these is termed Baldness; of the second sort, are, the Shedding or Falling off of the Hair, the *Alopecia*, and *Ophiasis*. There is indeed in all these Vices of the Hair a falling off of the Hair from the part (whatever it be) where formerly it was growing; and so (in the general) all these Vices may be comprehended under the name of *Defluvium* or falling off: but use hath so far prevailed, that the name *Defluvium* or falling off is (in special) taken for a certain Species of the shedding of the Hair, as we shal hereafter shew you.

As for Baldness, in the first place; look what *Patos* (that is to say, the falling down of the Leaves) is in Trees, the like is baldness in Animals, yea also in the very Trees themselves: whereupon *Aristotle* in his sixth Book of the generation of Animals, and Chap. 3. writeth: *Men (saith he) of all living Creatures are mostly subject unto baldness, and they evidently become so sooner then any other Creature whatsoever. Which kind of Affect is in a manner general. For of Plants likewise, some of them have allwaies green Leaves, others of them lose their Leaves. The like Affect is baldness in those men unto whom it happeneth that they should be Bald. For whenas by little and little (some now, some then) both the Leaves, and the Feathers, and the Hairs fall off; when this same Affect shal happen universally, then it receiveth these words, Baldness, falling of the Leaf, and shedding of the Feathers.* And *Columella* in his fourth Book of Husbandry, Chap. 33. saith that the young and tender Chesnut Tree that is infested by Mice and Moles, doth oftentimes become bald. Now baldness in a man,

Baldness what it is.

is a certain smoothness, or defect of Hair in the fore part of the Head, taking its original from the want of Aliment. And this most commonly chanceth naturally in the progress of yeers; but yet nevertheless unto some it happeneth preternaturally; which is thereupon to be accounted preternatural and vitious.

The Causes.

Touching the Causes of Baldness, Physitians do indeed very much differ in their Opinions. But if we wel weigh the manner how Hairs are generated in the Head, the business in Controversie wil not seem at all difficult. For whereas both the matter and the Aliment is sent and supplied unto the Hairs from the Brain more especially; therefore we say indeed, that the defect of the necessary Aliment is the neereft cause of this shedding or falling off of the Hair: yet nevertheless this Affect proceedeth oftentimes from the Constitution of the Brain; to wit, if it become more dry then is meet. *Hippocrates* tels us the same, in the sixth of his Epidem. Comment. 3. Tit. 1. where he thus writeth; *the Consumption of the Brain, and by reason thereof baldness; &c.* Where (as *Galen* tels us in his Comment. upon the place) by the Consumption of the Brain, that diminution thereof is to be understood, that happeneth unto old men from its extraordinary drineſs. For if the Brain once become extreamly dry, then there will be nothing superfluous therein remaining that may suffice for the nourishing of the Hairs. And *Aristotle* teacheth us the same, who (in his fifth Book of the Generation of living Creatures,

Chap. 3.

Chap. 3.) writeth, that baldness is caused from the scarcity of the moist heat and fatness, that is to say of the moist Aliment. For there is in old People an excrementitious humidity, that is rather too much abounding, then any want thereof. And indeed, as we have already said, baldness is natural unto the most, because that in the progress of their yeers (and as old age comes on) the Brain in every one becometh more dry then is meet: but yet unto some this baldness happeneth in their Youth and green yeers, to wit, unto those that from some preternatural or violent cause have their Brains overdried before the time; which Causes may be many. The Chief and most principal of them al is the immoderate use of *Venus*, that powerfully drieth the Brain. Whereupon it is that before the use of *Venus* none groweth bald; Neither are Eunuchs bald at all (in the sixth Sect. of the Aphorisms, Aphor. 28.) in regard they lose not, neither cast forth any Seed; and so the like may be said of Youths, and until they attain unto ripeness of yeers. Women likewise are seldom or never bald (and yet nevertheless *Albertus Magnus* testifieth that he saw two Women that were bald; in his nineteenth Book of Animals, Chap. 6.) in regard that their Constitution is naturally more moist; and therefore the Brain also in them is not so easily and soon dryed; and because that Women eject not such store of Seed as the Men do. The Brain is likewise overmuch (and oversoon) dried by too much Watching, Study, and Cares.

As for that opinion of *Altaurius*, who in the first Book of his Method, Chap. 5. assigneth overmuch humidity for the Cause of baldness, if any one hath a mind to reconcile it with the opinion of *Hippocrates*, *Galen*, and *Aristotle*, he cannot more fitly explain it, then by saying that the defect of Alimental humidity is indeed the Cause of Baldness; and yet notwithstanding that excrementitious humidity causeth that this baldness happeneth so much the sooner and more easily: after the very same manner that Leaves of Trees fal off indeed by reason of the want of necessary Aliment; and yet nevertheless they fal off sooner and faster, if any adventitious and Accidental humidity (Rain, or the like) happen.

Signs Diagnostick.

The very Truth is, that baldness of it self appeareth sufficiently unto the Eyes. But yet nevertheless in what respect it differeth from the other species of the falling away of the Hairs, we shal now explain unto you. This Baldness we now speak of differeth from the *Apolecia*, and the *Ophiasis* or *Area*, in this, that these Vices are fleeting from place to place, neither (in them) do the Hairs fal off from any certain parts of the Head; whereas baldness happeneth evermore in the fore-part of the Head. But from the falling off of the Hair, in special so called, this baldness differeth, because that in the shedding and falling of the Hair, the Hair al generally (or at least, the greater part of them, here and there, up and down throughout the whole Head) fal off; but in baldness this falling of the Hair is only in the fore part of the Head.

Prognosticks.

1. Baldness indeed in it self bringeth no danger at all (but that it causeth that the Head lieth the more open to be hurt by the externall injuries of the Air; and that it is as it were the forerunner and sign of the hastening of our Mortall Nature towards her dissolution) and yet notwithstanding it causeth a great deformity and unsightliness (especially if it happen early, in the time of Youth) and that that is resented and disliked by the most of those that behold it: and it is reported, that *Caius Julius Cæsar* the Emperor (famous both for his learning, and likewise for his warlike exploits) could so ill brook and bear the baldness wherewith he was affected, that after his making triall of very many Remedies to no purpose, it was at length granted unto him by the Senate, that he might perpetually wear the Lawrel: who if he were now at this day living, might easily cover his baldness with a Covering of Hair made of other mens Hair (we in *England* cal it a Perriwig) which is now adaies in very great and common use.

2. But that baldness that ariseth either from old age, or immaturely in the time of Youth, wil admit of no Cure; like as neither doth the shedding of the Teeth in such as have attained unto their ful growth, since that the defect of that Alimentary humidity cannot by any means be restored.

3. *Those that are Bald have not the Varices* (viz. the crooked swoln Veins in the Hipps, &c.) *very great: but those that during their baldness have these Varices coming upon them, these again recover their Hair*; as *Hippocrates* tels us in the sixth of his Aphorisms, Aphor. 34. But this Aphorism is false, as *Galen* in his Commentary, teacheth us: since that we are none of us ignorant that Baldness is an incurable Affection; and that it is likewise false, that great Varices never happen unto those that are bald; and also that upon the arising of the Varices the baldness ceaseth: unless haply (as some wil have it) he cal that *Calvitium* or baldness, that Physitians term *Madarosis*, that is, the falling off of the Hair. For this indeed in regard that it hath its Original from vitious humors (like as that we call *Ophiasis* and *Alopecia*) these very depraved humors being translated into the Thighs may cause the *Varices*, and so the man may possibly recover and receive his Hair again. For if there were at first a loss of the Hair by reason of their roots being corrupted by the said vitious humors; then good ground there is to believe that this Hair wil again now return unto its Naturall state, upon the translation of the aforesaid humors unto some other place.

The

The Cure.

But although that baldnes when it is arrived at its height can no waies be cured: yet nevertheles in regard that baldnes doth both exceedingly incommodate the health, and cause deformity; we must therefore do our endeavor al that may be, to prevent and retard it. Which can by no other means be done, than by repairing the aliment of the hair that beginneth to fail, and attracting it unto the skin of the head. And therefore we must do our utmost that the fat and hot humidity by which the hairs are nourished may be preserved and drawn unto the skin. There are some likewise that add moderate astringents, if the skin be become thin through the heat of the head. But whenas baldnes doth arise from the defect of Aliment; and whenas by reason of drines the pores and passages of the skin are closed and altogether shut up, there is no need at al of Astringents; for if they be administred, then the Aliment that floweth unto the hairs wil be altogether repressed.

Now what kind of Medicaments they are that correct the distemper of the head, and the drines of the brain, we have already shewn you in the first Book of our Practice, Part 1. Chap. 4. But that the Aliment may be attracted unto the roots of the hairs, frictions are to be first used before the Medicaments; which yet notwithstanding ought to be moderate, that they may only attract the Aliment, and not discuss it. But these Medicaments ought to be hot, and so attracting, with a moderate astriction, by which the Aliment may be drawn unto the roots of the hair, and there detained. *Dioscorides* in his first Book, Chap. 110. and *Galen* in his seventh Book of the faculty of Simples, §. *Cistus*, commend Ladanum; and yet more in case of the falling of the hair, than in baldnes: yet nevertheles very many there are that use the same likewise for baldnes, and especially the Oyl thereof, which they prepare in this manner:

Take *of the best Ladanum cut into smal pieces one pound; pour thereunto of Rose water six ounces; Oyl of sweet Almonds four ounces; boyl them together, and strain it often, until it be cléer. Or let the Ladanum be dissolved in the Oyl of Mastick, and then strained.* It is very good likewise to wash the head with the Decoction of Fenugreek. See more of these Medicaments for this use in *Galen* his first Book of the Composition of Medicaments according to the places, Chap. 1. And we shal also mention some more of them in the following Chapter.

The Dyet.

And first of al, a right Course and Order of Diet conduceth very much unto the retarding of baldnes. Let the meats therefore that the Patient eateth be of a good juyce and nourishment, (that is to say, such as affordeth a fat juyce) and of easie concoction. Let him abstain from meats that are salt, sharp, sowr, and austere (such as are most of the Summer Fruits) that yield but little aliment, and that also very fluid. Let his drink likewise be such as yieldeth a good juyce. But let him abstain from strong and old Wine, having in it a power to dry overmuch. Venery is especially hurtful in this Affect. Watchings, griefs, cares, and the anxieties of the mind are also hurtful in this Affect.

The want of a Beard.

We said before that the Beard was an Ornament unto a Man; and therefore if this be wanting in Men, it causeth a very great deformity. Now this may fail either altogether, as in Eunuchs, and certain others that are womanish and have altogether effeminate bodies: or else it breaketh forth very slowly, or groweth not so thick as it is wont. Al which happen, either from a defect of the matter, or else by reason of the thickness of the Skin out of which it is to break forth; or from such a Constitution as hindereth the appearing and growth of a Beard.

Now whereas the want of a Beard in men of that age wherein Beards are wont to bud and grow forth, doth breed some kind of unseemlines and deformity; and that such as are at their ful age (that they may hereby procure unto themselves both gravity, and respect from others) do much desire and endeavor after a Beard; it is therefore very usual upon this very account to cal in the help and assistance of the Physitian. But the truth is, the event seldom answereth the desire, or at least but very slowly, to wit, when Nature of her own accord attempteth the production thereof.

But yet nevertheles I think it not amiss here to give you a Medicament or two, for the aforesaid purpose: and more you shal have in the Chapter following.

Take *Oyl in which Southernwood hath been boyled two ounces; the ashes of Bees or Wasps one dram; Mous-tirds one scruple; Honey one ounce; Ladanum three drams; Bears fat as much as wil suffice: Make a Liniment.* Or,

Boyl Mugwort in Oyl, and let the place be anointed with the Oyl; which maketh very much for the forwarding of the slow growth of the Beard. Or,

Take *Pouder of the seed of Nightshade as much as you please, and Oyl of Eggs a sufficient quantity: mingle them, &c.*

Or let the place be often washed with the Decoction of Southernwood, Maidenhair, Golden Maidenhair, Rosemary, and the Reed root: and afterward let it be anointed with the Unguent that is made of Ladanum.

And if it be true (as some there are that think it is) that these Medicaments that even now we named,

named, and those that we shal hereafter further mention do not al of them generate hairs only by their manifest qualities, and by taking away the Causes of the falling off of the hair; but that they likewise produce hair by some occult quality that is in them; such like Medicaments are therefore especially to take place in the production of a Beard, not where there hath been a shedding or falling off of the hairs of the Beard, but where they never as yet grew.

It is also wel known, that it much conduceth unto the speedy growing of the Beard, if the first soft hairy down upon the Chin be often shaved off; by which means the Aliment is the more abundantly allured and drawn unto the Roots of the hair.

For the furthering and hastening of the Beard, these following Medicaments are likewise commended.

Take *Oyl of Dill, Oyl of Spike, of each five ounces; the tender Sprigs of Southernwood two handfuls; Squils three drams; the best Wine three ounces; let them boyl until the Wine be consumed, and then use it.* Or,

Take *Oyl of Garden Pinks, and sweet smelling Spike, of each three ounces; Oyl of Roses four ounces; of Cloves one dram; of Ladanum two drams; sweet smelling Wine two ounces. Let them boyl al of them unto the consumption of the Wine. Add of Musk one scruple, and mingle them.*

Chap. 3. *Of the shedding of the Hair.*

ALthough (as we have already said) al shedding of the Hair may be termed a *Defluvium* or falling off: yet nevertheless use and custom have so far prevailed, that the shedding of the Hair here and there in the Head (in al or most parts thereof) is in special termed a *Defluvium* or falling of the Hair; so that they fal not only in one place, but either they al fal off throughout the whol head, or at least they most of them fal away in most parts of the Head.

The Causes.

There is not one Cause alone of this *Defluvium* of the Hair, but the Causes are many; to wit, Either the want of Aliment, or the pravity of the humors corroding the roots of the hair, or the thinness of the skin, not admitting the aliment of the hair. The two former Causes have their place in those that are Phthisical; in whom if the hair fal off, this cometh to pass (as *Galen* tels us in his Comment. Aphorism 10. Sect. 5.) because there is here both the greatest defect of Aliment, and sometimes also the corruption of the humors. The same happeneth for the most part in malignant Feavers, such especially of them in which (the Brain being withal affected) the sick persons are seized on by a Delirye or Dotage. For even in these Feavers also the sick parties are greatly extenuated, and there is wanting unto the body a necessary aliment, and the depraved humors likewise lie gnawing at the roots of the hair, and eat them asunder. The hair also falleth off in those that have the French Disease, by reason of the pravity of the humors; which somtimes happeneth likewise unto those that have drunk poyson: and it is reported for a truth, That whosoever toucheth the Salamander his hairs wil shed and fal away. But somtimes also the hair fals off by reason of the thinness of the skin; and this happeneth unto Women, and especially in the Summer time. And hence it is, that those who travel out of *Germany* into *Italy*, or other hot Regions, find now and then this shedding of their hair: for by the heat of the Ambient Air the Skin is made thin; and it chanceth also that the matter out of which the hair ought to be generated doth withal transpire.

Signs Diagnostick.

The *Defluvium* or falling of the hair that is in special so called, is easily known by the continual shedding of the hair. But it is distinguished from baldness, the *Alopecia*, and *Ophiasis*, because that in Baldness the hair fals off in the fore part of the head only; but in *Alopecia* and *Ophiasis* the hair fals from al parts of the head, and the head alone; but then in this *Defluvium* (the Affect we now speak of) the hairs fal off in al parts of the body equally, one while more, and another while fewer of them. But from what cause it is that they fal off, may be known from the causes that went before. For if there went before any sickness that was in it self apt to consume the aliment of the Body, it is then credible that the shedding of the hair proceedeth from the scarcity of the Aliment. But if vitious, malignant, and depraved humors excite and cause any disease, it is then an argument that the falling of the hair proceedeth likewise from the pravity of the humors. If lastly, there went before causes rarefying the skin, it is then probable, that the said *Defluvium* of the hair proceedeth from the thinness of the Skin.

Prognosticks.

1. Among al other the species of the shedding of the hair, this *Defluvium* in special so called is most easily cured; unless the cause be such as is not to be removed. For the skin hath not as yet contracted any preternatural disposition that is difficultly cured. And therefore it is that the *Defluvium* or falling of the hair that happeneth after acute and malignant Feavers is easily cured; when the Feaver being healed, there is an Aliment again supplied unto the body; and the hair that is already fallen off is for the most part restored without

without the uſe of any Medicaments.

2. But in the Conſumption ſuch a defect of the Aliment, and ſuch a vice of the humors cannot by any means be amended. And therefore in this caſe there is not only no cure to be had for this ſhedding of the hair, but the ſick perſons die alſo. And therefore in ſuch as are in Conſumptions the falling of the hair is a ſure and certain ſign of Death approaching; as in the fifth of the Aphoriſms, Aphor. 11.

3. If the hair fal off by reaſon of the skins thinneſs, it may then by the uſe of thickners be reſtored without any great difficulty.

The Cure.

The ſhedding of the hair is cured by taking away the cauſe upon which it dependeth. If therefore the hairs fal away from the ſcarcity and want of Aliment, it ſheweth us, that we muſt uſe our endeavor that there may be ſufficient aliment bred in the body, and that that which is bred may be drawn unto the skin of the head. If this *Defluvium* be from the depraved humors, and theſe be ſupplied from al parts of the body, they are then to be evacuated; but if they lie only at the roots of the hair, they are then to be diſcuſſed. If theſe humors be of a poyſonous Nature (as in the French Diſeaſe) we ought then to meet with and oppoſe that poyſon. If the Affect proceed from the thinneſs of the skin, the skin is then to be thickened.

If therefore this *Defluvium* or falling of the hair ariſe from the want of Aliment, we ought then eſpecially to take care that by appointing a due & meet courſe of Diet there may be generated ſufficient ſtore of good blood. But for the drawing of this unto the place affected, frictions are more eſpecially to be made uſe of. Yea indeed, almoſt before the uſe of any Topicks, the frictions or rubbings of the head are to be adminiſtred, as *Galen* teacheth us in his firſt Book of the Compoſition of Medicaments according to the places, Chap. 2. For Friction doth both attract the Aliment unto the head, and alſo ſtrengthen and thicken the skin.

If this falling of the hair proceed from the pravity of the humors, then univerſal purgations (if need require) being firſt premiſed, the head is often to be rubbed, and diſcuſſives are to be adminiſtred; but yet let the Diſcuſſers be moderate (eſpecially if there be a concurrence of an abundant aliment) leſt that by the exceſſive and overmuch uſe of them the aliment be likewiſe diſſipated, and the skin rendered over thin: and therefore *Ladanum* is very fitly mingled together with the Ungueuts.

If the *Defluvium* depend wholly upon the thinneſs of the skin, then we ought to apply thoſe things that condenſe and thicken the skin. *Galen* commendeth eſpecially *Ladanum*, the Oyl of Maſtick, and the Oyl of Myrtle mingled together. Or elſe let Ladanum be diſſolved in Wine, and ſo made uſe of.

And Ladanum is alſo very fitly adminiſtred in almoſt every falling off of the hair. But in regard that it is of too thick conſiſtence in it ſelf to be anointed with, it is therefore to be diſſolved in ſomthing that is liquid (Wine or Oyl) and indeed ſuch an Oyl is to be made choyce of that may ſatisfie and anſwer the cauſe.

But ſeeing that Unguents and Oyls are troubleſom unto many, who wil not endure that their heads ſhould be anointed with Oyntments or Oyls; therefore for theſe we muſt provide Lotions for the head (that pleaſe them better) which are to be made of Southernwood, Maidenhair, Golden Maidenhair, Maſtick, Roſes, Roſemary, Ladanum.

And we muſt here again repeat what we gave you notice of about the end of the foregoing Chapter, to wit, That there are ſome who appoint (and not without good reaſon) ſuch kind of Medicaments to be made (for the recovery of the hair) that do not only by a manifeſt quality take away the cauſe of the ſhedding of the hair, but ſuch as alſo by an occult and peculiar faculty do conduce unto the breeding of hair; and ſuch as theſe are only known by experience. And theſe are, al the Capillary Herbs, Southernwood, Reed root, ſharp-dock root, the root of the greater Bur, Aſarabacca, Ladanum, Honey (and Water deſtilled from it) Bees beaten together with the Honey-combs, or the pouder and aſhes of them, as alſo of Waſps, Flyes, Moles, Mice, the Land Urchin, Bears fat, and Serpents fat. Of which there are made many Compoſitions. As for inſtance,

Take *the Rind of the Reed root burnt, Bees aſhes, of each two drams; Southernwood burnt one dram; Ladanum two drams; Honey half an ounce; Oyl of ſweet Almonds, and Bears fat, of each as much as wil ſuffice, and make a Liniment.*

For the ſhedding of the hair after ſickneſſes, this following is found to be good.

Take *Maidenhair, Southernwood, Golden Maidenhair, of each half a handful; the Leaves of Myrtle, of Roſes, and of Wormwood, of each two pugils: boyl them in a ſufficient quantity of common Oyl and red Wine, until the Wine be waſted; then ſtrain and ſqueeze them hard.*

Take *of the aforeſaid Oyl four ounces; Ladanum one ounce; Maſtick half an ounce, and mingle them according to art.* Or,

Take *Root of the Bur-dock ſix ounces; Maidenhair three handfuls; Southernwood one handful. Pour thereunto as much white Wine as wil ſuffice; and let them be deſtilled in a bladder: Unto what is thus deſtilled, if you pleaſe you may add the Water of Honey.*

Or elſe let the Roots of the Bur-dock be boyled in Ley, and the head waſhed therewith.

Chap. 4. *Of* Alopecia, *and* Ophiasis.

Alopecia: THat which is called *Alopecia* and *Ophiasis* is a peculiar kind of the falling of the Hair. *Alopecia* is so termed from Foxes; because that this kind of shedding of the Hair is familiar unto them. But *Ophiasis:* *Ophiasis* is so called from its figure, because that the bald and smooth parts, destitute of their Hair, and writhed, seem like unto Serpents. It is common unto both these Affects, that in them the Hairs fall off *areatim* (as they term it) and hence it is likewise that this Malady is in the general called *Area:* *Area.* And *Celsus* in one and the same Chapter treateth of *Area*, *Alopecia*, and *Ophiasis*. Now the name of *Area* is imposed upon this Affect from Country Garden-plats. For as there the Beds or quarters are distinct, and in certain places only; and as these Beds when they are void of Plants are Naked and bare; so it is likewise in these *Areæ*; for here in certain places the Skin appeareth smooth, bare, and slippery. These Affects differ only in their figure. For *Alopecia* hath no certain figure, but (as *Celsus* saith) *is dilated under any kind of figure.* But the *Ophiasis* creepeth up and down writhingly like unto a Serpent; and one while being extended from the hinder part of the Head it creepeth along on both sides the Head even unto the Ears, the breadth almost of two fingers; and as soon again being carried beyond the Ears it creepeth forward Serpent-like even unto the very Forehead it self. And moreover there is in the *Ophiasis* far more hurt and danger in the Cause thereof; so that not only the roots of the Hair, but even the Skin it self also is eaten and gnawn thorow, to wit, as far as the roots of the Hair reach. And so *Alopecia* and *Ophiasis* may be thus defined, that they are a falling off of the Hair after the aforesaid manner, *areatim*, having its Original from a corrupt and depraved humor gnawing assunder the roots of the Hair. *The definition of Alopecia and Ophiasis:*

The Author of the Book of Medicaments soon provided, referreth the *Alopecia* and *Ophiasis* unto those Affections that vitiate and marr the Colour of the Hair. But we are to know that this is not proper unto the said *Areal* falling off of the Hair; but that this change of Color in the Hair doth either precede the *Alopecia* and *Ophiasis* (to wit, when from a vitious Nutriment the Hair first becometh white, but afterwards they fall off) or else the colors of the Hair are changed after the *Alopecia* and *Ophiasis*. For when after the *Areæ* Hairs are again bred, they are then either white, or yellow; like as it is in Horses, after that the hair is fallen off by reason of some Ulcer caused by attrition or gauling, there is wont in the place thereof to appear and grow again white hairs; which happeneth from a vitious Nutriment, and the weakness of the Skin. And of this *Celsus* gives us notice, in his sixth Book, Chapter 1. to wit, that the *Ophiasis* is extended unto the Hair of the Head alone, but that *Alopecia* may be extended even unto the very Beard also.

The Causes.

The Cause of both these Maladies is a depraved and sharp humor of (eating assunder the roots the Hair) of whatsoever kind it be. But for the most part notwithstanding this Malady is caused by a salt flegm, adust, or putrified. Whereupon *Galen* in his Book of the differences of Symptoms, and Chap. 4. writeth, that these Vices follow a depraved Nutrition of the Skin of the Head. But that one while the *Alopecia*, & another while the *Ophiasis* is excited; and that the Hairs do sometimes constitute a strait and direct *Area*, and sometimes that that is winding and writhed, the Cause of this is the great abundance, and the quality of the matter. For if there be an extraordinary great store thereof, and it be likewise thin, then it equally and alike eateth through the Hair in the more and greater places; but if the Matter be less, and mingled with a thick humor, then there followeth an unequal and writhed *Defluvium* or shedding of the Hair; because that the humors being unequal and mingled do not flow right forward, but creeping along obliquely they gnaw assunder the hair.

The more remote Causes are the heat of the Liver and Head, and especially the fault of the first and second Concoction, by reason whereof salt and sharp humors are generated; which although it may happen in every age, yet nevertheless it happeneth more especially in Childhood and Youth; and it followeth the Affects, *Tinea*, *Achores*, and *Favi*, by reason of the Causes that we mentioned in the Diseases of Children.

And sometimes likewise External and Malignant Causes make very much for the generating of this Disease: among which *Galen* in his first Book of the Composit. of Medicam. according to the places, Chap. 2. reckoneth up Mushroms, because that they make very much for the generating of vitious and corrupt humors. And hither likewise belongeth the poyson of the French Disease, in regard that this also eateth through the roots of the hair; which other poysons may likewise do.

Signs Diagnostick.

We have already before told you in what respects this falling of the Hair differeth from baldness, and that shedding of the Hair that we call *Defluvium*. But *Alopecia* differeth and is known from

from *Ophiasis* by the very figure of the *Area*, and becauſe that in the *Alopecia* the hair only falleth off, without any hurt at all of the Skin. But in the *Ophiasis* there is not only a falling off of the hair, but likewiſe an excoriation of the Skin. And the very color of the skin is alſo changed; and in ſome it appeareth more whitiſh, in ſome more pale, and in others more black; and if it be pricked, there floweth forth a ſerous whitiſh blood. Touching the difference between *Alopecia* and *Ophiasis*, *Celſus* in his ſixth Book, and Chap. 4. hath theſe words: *That* Area (ſaith he) *that is termed* Alopecia *is dilated under all kind of Figures; and it happeneth in the hair of the Head, and in the Beard. But that which from the likeneſs of a Serpent is called* Ophiaſis, *beginneth from the binder part of the Head, and is not extended above two fingers in length; it Creepeth on both ſides the Head even unto the Ears: and in ſome unto their Forebeads alſo: the former of theſe in all Ages, but this latter only in Infants.*

But *Alopecia* and *Ophiasis* differ from *Tinea*, in this, becauſe that in *Ophiasis* the Excoriation of the Skin is ſuperficial; and when it is cured, the hair groweth again. But in *Tinea* the excoriation and Ulceration is more deep; and the skin is oftentimes ſo corrupted, that the hair never groweth again.

As for what concerneth the ſigns of the Cauſes, the Skin it ſelf ſheweth what kind of humor it is that offendeth: which that it may be the more exactly known, the hair that remaineth behind is to be ſhaven away, and the Skin to be gently rubbed: there are other ſigns alſo that wil inſtruct and teach us what kind of humor it is that aboundeth in the body. The hairs likewiſe that grow anew, by the various colour that they have (according to the Nature of the peccant humor) wil ſhew us what humor is the Cauſe of this Malady.

Prognoſticks.

1. *Alopecia* and *Ophiasis* although they bring not much danger along with them, yet nevertheleſs they cauſe a great deformity: and among the Romans thoſe Slaves that were diſfigured by the ſaid *Area*, and eſpecially by the *Alopecia*, were ſold at a far lower rate then other Slaves. And in our daies alſo, theſe *Areæ* (in regard that they cauſe a ſuſpition of the French Pox) are therfore accounted very diſgraceful unto him that is affected therewith.

2. But whether the *Ophiasis*, or the *Alopecia*, may be ſooneſt and moſt eaſily cured it is a great queſtion among Authors; and they herein much differ. *Celſus* and *Avenzoar* are of Opinion that *Ophiasis* is more eaſily cured then *Alopecia*. And on the Contrary, *Alexander* in his firſt Book, Chap. 2. and *Serapio* in his firſt Book, Chap. 1. teach us that the *Alopecia* is more eaſily cured then *Ophiasis*. But *Celſus* ſeemeth to ſpeak only of the *Alopecia* of Infants; which in the courſe of yeers and change of age is of it ſelf oftentimes cured. But if *Alopecia* and *Ophiasis* be ſuch as are grown to maturity, or likewiſe in one and the ſame age be compared the one with the other, then the *Ophiasis* ſeemeth to be altogether the more difficult to be cured, in regard that it hath its original from a matter more thick and fat worſe then the former, and ſuch as doth not only eat aſſunder the roots of the hairs, but likewiſe even the very Skin it ſelf; which is never done in the *Alopecia*.

3. Yet notwithſtanding by how much the longer either of theſe Maladies hath been and continued, by ſo much the more difficult is the Cure thereof; and by how much the leſs while they have continued, by ſo much the more eaſily are they cured.

4. If by Rubbing the place become red, there is then hope of Cure; the ſooner it is thus, the more eaſie the Cure: but if it wax not red at all, then there remaineth no hope at all of any Cure.

5. That kind of *Areæ* is alſo the worſt that hath made the Skin thick, and ſomwhat fat, and ſlick or ſlippery in all the parts affected.

6. *Alopecia* and *Ophiasis* that proceed from the Leproſie are altogether incurable; and that that hath its original from the French Diſeaſe is not to be Cured untill the Diſeaſe it ſelf be Cured.

7. There then ſhines forth ſome hope of a Cure to follow, when the extremities of the *Areæ* that are neereſt unto the remaining hairs do again begin to ſend forth other hair. For then thoſe parts that are nigh unto the ſound have the leſs receded from their Naturall State, and ſo conſequently will the ſooner again return unto their Natural State, and begin to produce hair.

The Cure.

If a Vitious humor abound in the whole body, this is firſt of all to be evacuated, for otherwiſe it wil continually cheriſh the Malady, by fomenting the matter thereof. And ſo if the French Diſeaſe be Joyned therewith, this is firſt to be cured; in regard that the *Areæ* cannot be taken away, unleſs this be firſt removed. As likewiſe the diſtemper of the Bowels upon which the breeding of the vitious humors doth very much depend, is to becorrected. And the antecedent Cauſe being taken away, the Containing Cauſe of the *Areæ* is then to be removed; which *Galen* doth by Repreſſers and Digeſtives: but we ought withal to do our endeavor, that the skin may be reſtored unto its natural temper.

And therefore in the firſt place the whol body is to be purged by fit and proper Medicaments, according to the Nature of the peccant humor. And

moreover *Galen* for the particular evacuation of the head, administreth Apophlegmatisms also, which we have elsewhere explained.

But for the matter which is yet in its flux, and in the beginning thereof, before the *Areæ* are yet made, *Galen* maketh use likewise of Repellers. And the same likewise we are taught by *Avicen*; where he telleth us that the Medicaments in the *Alopecia* ought likewise by a moderate astriction to corroborate the skin of the head; for in the seventh part of his fourth Book, Tract. 1. Chap. 6. he saith thus: *And it is requisite that there be in those Medicaments a comforting and strengthening, thereby to prevent and hinder in the head the reception of malignant matter.* But otherwise, and if the *Alopecia* and *Ophiasis* be already present, Repelling Medicaments have then no place; even as likewise they have no place in *Scabies* or Scabbiness.

But if the Areæ be already made, and the matter impacted into the skin, we ought then to use Digestives. Now these are hot, of thin parts, and not greatly drying. For if we make use of those things that dry overmuch, not only the vitious humors, but even the very aliment of the hair wil be then discussed. Yea, since that in the *Areæ* confirmed the distemper of the skin is hot and dry; therefore cold and moist Medicaments are to be mingled with the rest.

But now these Medicaments that take away the nighest cause of this Malady, are termed *Metasyncritica*; of the preparing of which *Galen* teacheth in his first Book of the Composition of Medicaments according to their places, Chap. 2. and in his fourteenth Book of the Method of Physick, Chap. 12. To wit, in the first place, if there yet remain any hairs that are corrupted, these are to be plucked out either with the *Volsella* (an Instrument purposely made to pul out hairs) or they are to be drawn forth with a *Dropacism*, or else the place may be shaven with a Razor. And then afterward let the head be washed with a Ley in which Maidenhair, Golden Maidenhair, Southernwood, and the like Plants have been boyled. After the washing, let the place be rubbed with a Linen cloth (that is not over moist, nor yet over dry) until the skin begin to be red: when this is done, then let Topicks be administred. Now such like Medicaments are, Mustard seed, Cresses, white Lily Roots, which (as it is said) wil likewise restore those hairs that burnt places have been deprived of by fire or scalding; Rocket seed, Nitre, Oyl of Bayes, liquid Pitch, Sulphur, the pouder and ashes of Southernwood, the Root of Sowbread, and Hellebor, the seed of Stavesacre, and Doves dung; and (these being the strongest and most powerful of al) Thapsia and Euphorbium. Which aforesaid Medicaments notwithstanding by how much the newer and fresher they are, by so much the sharper they are also; and the older they be, the more they lay aside their sharpness and tartness. But out of these such of them are to be made choyce of that are proper and convenient unto each of these Affects; and these are also rightly to be administred. For those Medicaments that were by us even now mentioned, they are not al of them fit for al kinds of Areæ, or at al times, or after any manner administred, or in al ages; but unto each of these there are such Medicaments as are fit and proper; and each of these Medicaments have likewise their due time and manner of use: and unto the Malady when it first begins, (and being yet but smal) the weaker sort of them are to be administred; but if the Malady be inveterate, then the stronger sort of them: and unto the softer bodies (such as are the bodies of Children and Women) the weaker Medicaments; but unto such as are at their ful age, and unto Men, the stronger sort of Medicaments are to be applied.

Galen acquaints us with divers Compositions that had been examined by long Experience, and approved of (in his first Book of the Composition of Medicaments according to the places, Chap. 1.) to wit, Those of *Heras*, *Crito*, *Orestinus*, *Ortho* the Sicilian, *Cleopatra*, *Archigenes*, *Asclepias*, *Dionysodorus*, *Soranus*, and others.

Galen himself commendeth this following:

Take *Leaves of the Greek Reed burnt half an ounce*; *the Urchin burnt one dram*; *Mouse-dung two drams*: *bruise and mingle them wel with Vinegar, and so anoint the place therewith.* Or,

Take *ashes of the burnt Reed, Goats hair burnt, Maidenhair, Bears fat, liquid Pitch, Rosin of the Cedar, of each alike*: and this he calleth the admirable Remedy. Or,

Take *House Mice burnt, a piece of linen Cloth burnt, Horse Teeth burnt, Bears Fat, the Marrow of a Hart, the rind of the Reed, equal parts of al*; *Honey as much as wil suffice*; *and make an Unguent.* Or,

Take *Euphorbium, Thapsia, Oyl of Bayes, of each two drams*; *live Sulphur, both the Hellebors, of each one dram*; *Add Wax six drams*; *which may be moistened with Oyl of Bayes, or old Oyl, or liquid Pitch, and mingle them together:* And this Medicament is of al other the strongest, and therefore most convenient for the Malady when it is become inveterate.

In the Malady that is more mild it wil be sufficient to use a Medicament made of Southernwood, or the roots of the Reed burnt, mixt and incorporated with old Oyl, Oyl of Bayes, or liquid Pitch. Or,

Take *Rocket seed, Cresses, Nitre, equal parts of them al, and let them be mingled with Oyl of Bayes, or liquid Pitch.*

This that followeth is yet more mild, and therefore fit for Women and Children.

Take *Southernwood, the ashes of the Root and Rind of the Reed, Frankincense, of each of these*

these equal parts; Bears Fat, and Oyl of bitter Almonds, of each as much as wil suffice, and make a Liniment.

But if it be needful to make it stronger, then add thereto *Spuma Maris*, live Sulphur, Bulls Gall, Rocket seed, Nitre, or even Thapsia also. Or,

Take *Mustard seed, Thapsia, the seed of Cresses, equal parts of them al; when you have beaten them into a very fine pouder, then add Oyl of Bayes, and Rosin, of each alike, as much as will suffice; and at the fire make hereof an Emplaster according to art.*

Such like Medicaments (good store of them) are likewise extant, and in divers places here and there, in the Writings of *Valescus de Taranta, Rondeletius, Vallerius, Trincavellius*, and other Practical Physitians.

And this is likewise in the use of the stronger sort of Medicaments to be observed, that in the beginning, the more liquid and softer Medicaments, and such as are tempered by the mixture of Oyls (that somwhat abate the force of the stronger Medicaments) may be administred; and after the use of the first Medicament we are to look what alteration it hath made in the part affected; and afterward (as need shal require) the strength thereof is either to be augmented or abated. Now whether or no there be any alteration made may be discovered by this especially, if we take notice, and wel observe, whether the skin after the use of the Medicament be made ever a whit the redder, or no; or whether it were made red by a light and gentle, or else by a stronger friction. For we ought to be very cautious, that the skin be not burnt through by the too often repeated use of the stronger Medicaments. And as touching the use of Compound Medicaments, you are likewise to take this advice, to wit, That if the hair be altogether shaven off, it wil be then more convenient to apply Medicaments of a more solid form, such as are Emplasters: but if the hair be not shaven away, then those Medicaments that are liquid and soft, such as are Liniments and Unguents.

But then the weaker Topical Medicaments are to be continued unto the head both day and night, that so they may exercise and put forth their strength and vertue. But if the Medicaments be of the stronger sort, they are then to be detained upon the head so long, until there appear to be some alteration in the skin caused by them, and that there begin to arise some kind of pain. And therefore in the use of the stronger, the place affected is dayly once or twice to be viewed, and if the Medicaments have strongly affected the place, we are then to return to the milder sort of them; and the place is to be anointed with Goose Fat, Oyl of Dill, or the like Anodyne Medicament. For if the stronger Medicaments be too long kept upon the skin, it wil burn the same. And *Christophorus a Vega* writeth, that he had seen very many who by the use of Medicaments that were overstrong were thereby brought unto a perpetual baldness, and continued beardless unto their dying day.

The Diet.

A good and due course of Diet maketh very much also for the curing of the said *Alopecia* and *Ophiasis*; which let it be such as that good blood may be thereby bred, and the encrease of bad humors prevented. And therefore let the Patients meat be of a good juyce, that may bring the depraved humors unto a benign and good temper. Let the Patient abstain from Wine, before his body be purged, because that Wine carrieth the bad humors that are detained in the body along with it into the Veins. But when the body shal be sufficiently purged, then the Patient may drink that Wine that is temperate and a little sweet, seeing that it nourisheth wel, and breedeth good blood. Let the Air in which he breatheth be hot.

Chap. 5. *Of* Tinea, *or Worms eating off the roots of the Hair.*

AMong those Affects in the which the Haits fal off, that Affect is by no means to be passed over in silence, in the which the hairs indeed, not whol, but in pieces (or piece-meal, as we say) fal off, being eaten through and consumed by certain Worms. There are but very few Authors that make mention of this Affect; neither (as it seems) was it known unto *Platerus* (though otherwise a most experienced Physitian) whom we find thus writing; There are some (saith he) who affirm that the hairs of the head and beard have been gnawn and eaten asunder by certain Worms so smal that they could hardly be discerned. But yet nevertheless it is an Affect that is commonly known with us; and I my self have often seen it, and it hath been offered unto me to Cure. Our Germans cal it *Haarmilben oder Milen*. And this kind of smal Worms that are scarcely visible to the Eye (and which whether they have in them any life or not, we cannot discover but only by their motion) are bred in Cheese, Honey, (if there be but a little bread added thereto) old Wax, Prunes, and dried Cherries, and divers other things besides. And without doubt this species of little Worms is of the same kind with those that (as *Aristotle* writeth) are the least sort of al Worms, and that they breed in old Wax, and in Wood; and in his fifth Book of the History of living Creatures, Chap. 32. he calleth them *Acari*. A Latine word there is none other for it, unless we think good to cal it *Tinea*; because that like as Garments are eaten by the moth; so are the hairs likewise by these Worms, being bred in the hair.

The

The Causes.

As Lice and other kind of Vermine have their certain matter out of which they are bred (all kind of Vermine being not generated from al kind of matter) which cannot possibly be known but by experience: even so likewise this kind of smal Worms is bred (as we have said) in Wax, Honey, old Cheese, Cherries, and dried Prunes; as also in the hair of the Head, and oftentimes in the Beard. But without doubt they have their original from a certain excrementitious humor, that together with the Aliment of the hair, penetrateth into the said hairs; and there being cherished by the heat of the Head it converteth into little Worms, that afterward sticking unto the hair (for from whence they are generated from thence they seek their nourishment) they corrode the same, so that they fal off piecemeal.

Signs Diagnostick.

This Affect is sufficiently manifest of it self. For the hairs are made shorter, and unequal; some of them being more, and some less Curtaild. These little Worms stick in the extremities of the said hairs; and there they from day to day corrode and decurtail them: but whether or no they stick likewise in the midst of the hairs, for this we must Consult the Sight, and take an exact view of the hairs thus affected. The color likewise of the hair (if it be black) is changed; and by reason of those little Worms sticking unto them, it becometh (in some certain places) as it were of the color of Ashes

The Prognostick.

The truth is that this Affect hath in it no danger at all; and yet nevertheless it causeth a very great deformity, and unsightlines, especially in the Beard, by making the hairs unequal; some of them being shorter, and some longer; and the Beard it self seemeth foul, sluttish, and Nasty. This Affect is also hard to be cured.

The Cure.

For the Cure hereof there will be need of those Medicaments that Cleanse away these small Worms; and that digest, and discuss the matter from whence they are generated. Neither doth it seem from the purpose, that we purge the whol body, since that these Worms arise from a vitious humor mingled together with the aliment of the hair.

Take *of Broom one ounce, Myrrh two drams, Vinegar as much as will suffice; boyl it a little; and let the hair be Cleansed with the straining.* Or,

Take *Nettle seed pulverized; let it be macerated in Vinegar, and the hairs wel wet with the same.*

The Decoction likewise of Fenugreek and Scabious made with Ley is very useful in this Case; and so are also Squils, with the Leaves of Myrtle and Sage boyled in Oyl. Or,

Take *Garlick, Centaury the less, equal parts of both; boyl them in Vinegar; and add thereto the Gall of a Bull.* Or,

Take *the greater Nettle; boyl it in Ley, and wash the Head therewith.* Or,

Take *Southernwood, Root of Avens, and Wormwood; boyl them in Vinegar and Spring Water, as much of the one as the other, and let the hair be washed with the Decoction thereof.*

Chap. 6. *Of the Cleaving of the Hair.*

And sometimes likewise the hairs on the Head, and in the Beard, are cloven and divided; so that those that before were single and but one now seem and appear to be cleft into two. Which Vice of the Hair happeneth without doubt from some sharp humor, cleaving the Hair in the ends of them. But now, since that this Vice breedeth some kind of deformity, it is therefore to be amended. Which is done, if that part which remaineth be anoynted about the ends of them with the Gall of a Bull and be afterwards again washed with the Decoction of the Capillary Herbs, Southernwood, the Reed, and the like.

Chap. 7. *Of hoarines in the Head and Beard.*

For a Man in old age to become grey and hoary in his Head and Beard, is a thing altogether Natural: but yet sometimes nevertheless it so happeneth, that immaturely, and oversoon, hoarines appeareth in some before their old age, yea indeed before they are come to be Men. And furthermore Hoarines cometh on and appeareth leisurely and by degrees.

But yet it is observed, that some persons have suddenly and all on an Instant become white and hoary. And to this purpose, *Scaliger* in his Exercitation 312. relateth a History of something that happened under *Franciscus Gonzaga*. This *Gonzaga* having committed and imprisoned a neer Kinsman of his in a strong Castle, upon suspition of treachery in him, thereby to reserve him until he were questioned and punished according to his demerits; news was brought him next morning, that his Kinsman was suddenly become all over white and hoary. And the like we read in *Lemnius* in his second Book, Chap. 2. of Complexions: and in *Hadrianus Junius*, in his Comment. upon the Hair: In *Ludovicus Vives* his *Scipio's Dream*; and in *Cœlius Rhodiginus*, in the third Book of Ancient Reading, Chap. 24. and in the thirteenth Book, Chap. 17. And *Cuspinian* relateth

lateth many Hiſtories of ſuch as ſuddenly out of fear became gray and hoary; and ſo doth *Johannes Schenkius* relate the like, in the firſt Book of his Obſervat. And of this kind of hoarineſs it is (that cometh immaturely and before its due time) that I am here in this place to treat. For this Affect (in regard that it both depriveth a man of his Natural beauty, and likewiſe betokeneth that the health is not right, and as it ought to be; it is therfore not without good cauſe made the ſubject of the Phyſitians care and pains. As for that grayneſs, whiteneſs, and hoarineſs that chanceth unto men and women in their old age, and is a Natural ornament of their old age, to endeavor to cover and hide this with fucuſſes and other artificial paintings, is altogether whoriſh, and an Argument of a light, wanton, and luxurious mind.

The Cauſes.

It is not to be doubted that natural hoarineſs doth proceed from the change and alteration of the temperament of the body, and the blood that nouriſheth the hair. But here we are to enquire how it cometh to paſs that there ſhould be ſometimes ſuch a change as this in the blood and aliment, in thoſe that are yet in their youth and green yeers. *Ariſtotle* (in his fifth Book of the Generation of living Creatures, Chap. 5.) writeth, That the Aliment that produceth theſe white and hoary hairs (when it is not concocted) doth rot and putrefie, and ſo becometh a white hoarineſs; becauſe that the filthy ſnottineſs of them being rotten is almoſt white. And ſo he deduceth this hoarineſs from the defect of Native heat; which when it cannot concoct the humors, theſe humors being deſerted by their natural heat are then the more attempted by an external and adventitious heat, and ſo they become putrefied; from which putridneſs they are made white. *Galen* ſeemeth to follow the opinion of *Ariſtotle*; when he tels us in his ſecond Book of Temperaments, Chap. 5. That the hairs are made white, becauſe that the aliment whereby they are nouriſhed is as it were the ſnot of flegm, which in ſpace of time putrefieth. And that which *Ariſtotle* calleth putridneſs he termeth *Situs*, and we cal it filth, ſnot, or ſnivel: this being ſuch a kind of affection as happeneth unto Bread in the Dog daies, which we therefore call ſinnowed or hoary Bread. And for this cauſe likewiſe it is (as he writeth) that men are more apt to grow hoary in their Temples, becauſe that the fore part of the head is (by reaſon of its drineſs) more prone to baldneſs; but the Temples, by reaſon of their humidity, and conſequently upon the generating of ſnot and filth from the putrefying of the aforeſaid humidity, are more apt and prone unto hoarineſs. The Opinion of *Galen* in this one thing only ſeemeth to differ from that of *Ariſtotle*, to wit, That *Ariſtotle* ſpeaketh only in the general, without making mention of any one particular humor; whereas *Galen* writes that hoarineſs proceedeth from the putridneſs of flegm alone. And here it is altogether more ſafe, by flegm, to underſtand any ſimple crude humor, then flegm properly ſo called; and that any crudity rather than that putridneſs only which is ſo called, may be the cauſe of hoarineſs. To wit, (that we may in a word or two propound our opinion touching this very thing in controverſie, of which others have ſo largely diſcourſed) ſeeing that the hairs (as we ſaid before) are not generated and nouriſhed from vapors, or excrements elevated in the form and likeneſs of vapors, but rather from the blood, as al other parts are, it is without al diſpute, that the blood that is generated in old age is not ſo freſh, flouriſhing, and temperate, as in youth; but that as the body is now haſtening toward death, ſo the blood alſo that is therein bred is nothing ſo good as formerly; which is cleerly ſhewn and manifeſted even by the change and decay of that freſh and lively color of the body, and that witheredneſs that befalleth men and women in their old age. And therefore we are not to wonder, that (ſeeing the blood that nouriſheth the hair is now become far worſe than before) the color of the hair ſhould likewiſe be changed; neither that the hairs (that retain their own natural conformation and nutrition even until a mans death) ſhould only from ſome filth and ſnot (that is wont to happen unto thoſe things that putrefie) ſuffer any ſuch like thing as that we now ſpeak of. But now that in *Vitiligo* and *Leuca* this color is preternaturally changed, it is doubtleſs from this, That in the ſaid Affects there is not ſupplied unto the hair ſo good an aliment, but ſuch as is full of excrements, and eſpecially flegmatick excrements. But in ſuch as are hoary before their time, in theſe no doubt there is a fault and ſomthing amiſs even in the very humors; and if not in the whol body, yet at leaſt in the head and temper of the brain. Neither is it impoſſible but that theſe who are thus hoary in their youth or middle age may come to be thus affected, and to ſuffer what we are now ſpeaking of, either by reaſon of the Seed, or ſome diſpoſition in the Teſticles; and we have already told you before, that evermore the Seed and the Teſticles do make very much in the change of the color of the hair. And again, ſince that the Paſſions and Affects of the mind (eſpecially fear and terror) may poſſibly effect ſuch notable changes in the humors, and that they may likewiſe greatly affect the brain; it is therefore no wonder that in a ſhort time hoarineſs ſhould be produced from that change that is made in the humors. For if from a ſmal Cloud, or the Air, or a hurtful Wind blowing upon Trees, the color of their Leaves may be changed, and the Leaves may thereupon wither, (the Tree it ſelf, and other parts thereof remaining ſafe and untouched; it is not impoſſible alſo, but that the color of the hairs (as of the moſt ignoble

noble parts of our body) may likewise be changed from some humor, or spirit suddenly invading and seizing upon them. And this may be also confirmed even by that which *Hollerius* (in his first *Perioche*) writeth, to wit, That the hairs have suddenly been turned white and hoary by the vapor of Hydrarge.

Signs Diagnostick.

The change of the color of the hair into whiteness or hoariness is sufficiently manifest of it self; neither is there any need of signs to discover it. And if in the declining age the hair grow hoary, it is no more than what is natural; and this change is made but slowly, as coming by degrees, as age encreaseth. But if this happen before old age, although it be but slowly, yet it is preternatural; but it is much more preternatural, if a man or woman become hoary al on a sudden.

Prognosticks.

1. That hoariness that is natural (as happening in old age) can no way be amended; as neither likewise can the witheredness in old age: yea indeed it ought not so much as to be attempted by the Physitian; since that the hoary head is rather an ornament unto those that are old, than any thing of which they should be ashamed.

2. But that which is preternatural, as it ought to be corrected (in regard that it signifieth some kind of preternatural affect and vitious disposition (in the brain more especially) so it also may be amended; since that if the said vitious disposition be amended, the color of the hair wil likewise be changed.

3. That hoariness that is from the *Vitiligo* (a kind of Leprosie) is upon the curing of the said Disease likewise amended.

The Cure.

The hoariness that is incident unto old age (as we have already told you) cannot any waies be amended; neither indeed ought it to be palliated and hid with any artificial *fucus*; and he that shal attempt any such thing may deservedly be laughed at; touching whom *Martial* (in the fifth Book of his Epigrams) thus:

Thou seemst, Lentinus, *by thy dy'd hairs young again,*
And soon art made a Crow that wast erewhile a Swan.
Thou canst not al deceive, for Proserpine *wel knows*
Thy hoary head; and wil discover thy false shews.

But that hoariness that is caused by *Vitiligo* and *Alphus* is taken away upon the removal of the said Diseases; and especially if Medicaments that prolong the hair be administred. For then new hair growing up from the good aliment, those old hoary hairs wil be soon abolished.

But if immaturely and before the due time this hoariness threaten, or suddenly invade any person (whether man or woman) the better to preserve from it, and to cure it if present, we must do our best endeavor that good blood may be produced in the whol body (and especially in the head) that may supply unto the hair a good and fit aliment; and withal the vitious humors (if there are any such present) are to be evacuated. Neither ought the particular evacuation of the head (by Sternutatories and Errhines) to be omitted. And after this we are to make use of those Medicaments that strengthen the Native heat of the body, and more especially the brain; touching which we have already spoken in their proper place.

The Arabians commend this Confection:

Take *of the black Myrobalans without their Kernels five ounces*; *Ginger, Ammi, (or Bishops-weed) of each ten drams*: *let them be throughly moistened with Butter*; *and then add Sugar of Penidies to the quantity of the one half*: give often of this Medicament one dram.

Topicks.

As for what concerneth Topicks, *Galen* indeed (in his first Book of the Composition of Medicaments according to the places, Chap. 3.) propoundeth Medicaments that are hot, and of thin parts, when he had a purpose to discuss and scatter the snotty filth, and to dry up the superfluous humidities in the skin. But unless that there afterward flow thereto such a like aliment that may again generate hair of the Natural color, such Medicaments as these wil avail but little. Others there are therefore that make use only of those Medicaments that dye and make black the hair. In doing of which notwithstanding we are well to heed and weigh what honesty wil allow of; and withal we are to take heed that by no means we bring any hurt unto the Brain. For these Medicaments that make black having most of them an astringent power, and being withal cold, are very apt to produce the Apoplexy, Epilepsie, deep and profound sleep, Catarrhs, and the like Maladies; and this *Galen* tels us he hath seen and observed to befal some certain Women in his time.

But now among these like Medicaments, *Galen* preferreth *Cadmia* or Brass Oar, before al the other; in regard that by this Medicament the hairs are made black, the rottenness and filthy snot is discussed, and the il disposition of the head amended. The Oyl of Costus is also commended, and so is the Oyl of Coloquintida, or bitter Gourd, of Nightshade, and of Mustard seed.

Some few hours after the anointing, let the head be washed with a Ley of the ashes of Beans, Nutshels, in which Litharge hath been boyled; or with a Ley in which the Pulp of Coloquintida

(so

(ſo much commended by al) hath been boyled. There is likewiſe commended the Oyl of wild Olives, Myrobalans of al the ſorts (which are ſaid to retard and hinder hoarineſs, both inwardly taken, and outwardly applied) Gals, Acacia, Fenugreek, Henbane ſeed, Ladanum, the juyce of Walnut ſhels while they are green, the Leaves of Capars, and likewiſe the Roots of them, boyled with Milk, maſhed, and then in the form of a Cataplaſm applied for a nights time; the rind of the holm root boyled unto a ſoftneſs, and impoſed; Sage, and Copperas.

Now theſe kind of Medicaments are to be continued; and albeit they appear not to do any good at once or twice uſing, yet nevertheleſs we are not to deſiſt from the uſe of them, but we are ſtil to perſevere, and continue in the ſame. Touching theſe kind of Tinctures, this is likewiſe to be taken notice of, That if you wil have them ſtable and laſting, it wil be very fit that a Lotion of the head be premiſed, that is made with ſuch a like Decoction that both giveth a beginning unto the Tincture, and that likewiſe cauſeth that it continue firm; like as Cloth-Dyers when they intend to dye a piece of black Cloth, they firſt put upon it a red color with Madder, or a Sky color with Woad. And therefore let the hairs that are to be dyed be firſt waſhed with a Ley in which Roch Alum hath been diſſolved. And in the choyce of Medicaments, we are likewiſe to endeavor, that ſuch like Medicaments may be choſen that are no waies unpleaſing in their ſmel, but rather ſuch as are ſweet and pleaſant.

This following is found to be ſure and certain, and by much uſe approved of.

Take Ley *half a pint, boyl in it Litharge of Gold four ounces:* In this Decoction let a Spunge be wel wet, and let the hoary hairs be throughly moiſtened with the ſaid Decoction, by the ſpace of a quarter of an hour in a warm place. And then let the head whiles it is wet be forthwith covered for one hour with a Linen Cloth: and afterwards let the hair and the head be waſhed with a ſimple Ley, and not with that which is overſtrong: and this is to be done twice a week.

He writeth that the Mercurial Medicament that followeth wil within one month (and often in leſs time alſo) make black al the hair.

Take *black Myrobalans one ounce, black Raiſins two ounces; aſtringent Wine three pints; boyl them in a double Veſſel by a gentle fire, to the conſumption of two thirds; then add of the juyce of green Walnut Rinds half a pound, Sumach and Acacia, of each one ounce, Cloves one ounce and half, Muſk one ſcruple: boyl them again in a double Veſſel for half a day.* Let the hairs be anointed with this Medicament about night, and then let the head be covered with a black woollen cloth: and in the morning following let it be waſhed with Wine in which black Myrobalans have been boyled. And *Aviceh* writeth that if Cloves be added unto theſe kind of Medicaments, they wil ſufficiently dye the hairs, and prevent the Brains being hurt by the Tincture. Or,

Take *Leaves of the Vine, and the Rinds of the Vine Roots, and Parietary: Boyl them in Water, and afterwards add Allum, Galls, and Vitriol; and ſo mingle them.* Or,

Take *Green Nuts in the month of* June, *and bruiſe them ſmal; and mingle therewith Allum half a pound; and in a new pot pour in unto them of Oyl three pints; and let them ſtand digeſting twenty daies; let them be afterwards ſtrained, and the head anointed with the Oyl.* Or,

Take *the Coloquintida Apple; make a hole through it, and take forth the ſeeds, and fill it up with Oyl of Bayes and the ſeed of Henbane; let them ſtand for one whol night, and then let the Oyl be preſſed forth, with the which the hair may be anointed.* Or,

Take *of Ley five meaſures, Litharge two ounces; Sage leaves two handfuls; boyl them to the conſumption of the fourth part, and make a Lotion for the head.* Or,

Take *Tartar one ounce, Litharge half an ounce, Juyce of Sage as much as wil ſuffice; mingle them in a Leaden Mortar, and make an Unguent;* with which (uſing it with a Leaden Comb) let the hairs be anointed. But here to add any more Medicaments is not worth the while, in regard that there are many more of them every where extant.

But now theſe Medicaments that make black the hair are not only made uſe of for the covering and hiding of hoarineſs; but in our *Germany* a black color of the hair is greatly deſired and endeavored after by ſome certain of our noble Virgins; either that they may ſeem to have ſomwhat Exotick, ſtrange, and forreign; or elſe that they may be differenced from the vulgar and Plebeian young Maidens, unto whom the yellow or golden color of the hair is moſt acceptable, and in moſt account. And thus every one hath ſomthing or other fair in his own eye, and high in his own account, although not ſo in anothers. And therefore theſe Virgins ſeem to me to do juſt as that Blackmoor did that lived in the Court of a certain German Prince, who often ſeeing in the Womens Ward a white Virgin, and withal a black Whelp, he would tel the Virgin that ſhe was not fair and beautiful, but rather that the black Whelp was beautiful and fair; and ſo (as *Julius Cæſar Scaliger* ſaith)

Black ſeems moſt fair
To thoſe that are.

What things they are that make the hair yellow.

But more right is the Judgment of the other Virgins, that ſeek and endeavor after a yellow or golden

color of the hair. Now this yellow color of the hair may be gained, if the hairs be washed, and likewise their Hair-laces wel wet in that Water or Ley in which the flowers of Broom, or of the yellowish Mullein, of the Citron-color'd Stæchas or Cassidony, of Camomile, Citron rind, the Cowcumber root, and the root of Gentian, have been infused. And likewise Lupines boyled in Water make the hair yellow; and so also doth the Water and Oyl of Honey. And they commonly likewise use (for the Combing of the hair) the Ley that is made of the Ashes of Vine shoots; which wil be somewhat more efficacious, if there be infused therein the Leaves of Citrine Stæchas, or of Mullein. But there are more of these like Medicaments every where to be found.

Chap. 8. *Of the Scurfineſs, and Dandriff of the Head.*

NEither are we here to pass over those Vices, which indeed happen not unto the hairs; and yet nevertheless they are about the hair and in the Skin that is covered with hair, and wherein it groweth; and of this sort are *Phthiriasis* or the Louse Evil, and *Furfuratio* Scurf and Dandriff, like unto Bran. But having already spoken touching *Phthiriasis*, in the fourth Book of the Diseases of Infants, Chap. 5. It now remaineth that we treat of the *Furfuratio*, or the Dandrif of the Head, Beard, and Eyebrows.

Scurf and Dandrif.

This *Furfuratio* (which the Greeks cal *Pityriasis*, and which is by the Latines called likewise *Porrigo*) is an Affect, wherein when there is any scratching there falleth down out of the Skin of the Head something very like unto Bran; and indeed most usually from the Skin that is under the very hairs themselves; and sometimes also from the Beard, and the Eyebrows.

The Causes.

The Cause of this Affect are humors that are serous or wheyish, and also *Ichores* or thin Excrements (not only such as are flegmatick, but such as are Cholerick also) elevated unto the Head together with that humor that yieldeth and supplieth matter unto the hairs; and hence it is that this furfuration or scurfineſs doth appear only in those places of the head that have hair upon them: for this matter seeking a passage forth through the Pores of the Skin, the thinner parts of them are discussed, but the more thick and Clammy parts stick in the Skin & about the hairs, and there they pass into a matter that is like unto Bran, or Scales. The antecedent Causes are all those that may any way generate these serous humors in the Head. But now the mater is attracted and drawn unto the Head, in those especially that have a hot Brain.

Signs Diagnostick.

The Affect it self sufficiently manifesteth and discovereth it self when the Head is Scratcht, Rub'd, or Comb'd; for then there fal down certain smal scales resembling Bran.

The Prognostick.

This Affect hath no danger at all Joyned with it; yea by some it is accounted for a very good Sign of a sound Brain, expelling and driving forth the excrements from it self; and yet nevertheleſs it causeth some kind of deformity and much trouble.

The Cure.

The vitious humors if they abound in the body are to be evacuated, and care taken that they may no more be generated.

But unto the Head it self Discussive Medicaments are to be administred. There are some likewise that therewith mingle some certain Astringents, that the part affected may be strengthened, lest that it easily receive the humor that floweth thereunto. But then it is to be feared, lest that the transpiration in the Head be hindred, and the excrements therein contained excite far worse and more grievous Maladies.

And therefore as *Galen* in his first Book of the Compositi. of Medicaments according to the places, Chap. 5. teacheth us, the Head is to be washed with the Decoction of Fenugreek, the Juyce of Beets, and Nitre. Or else it is to be Cleansed with the Decoction of Melon Seed, the meal of Cicers, Lupines, and Beans. Or else let it be washed with the Decoction of Cicers and Melons, adding thereto a little Vinegar. When the Head is washing, in stead of Soap, bitter Almonds bruised may be made use of.

If the Malady be confirmed, and wil not yield, let the Head be first washed with the Medicaments but just now mentioned; and after this let it be rub'd with a course Cloth, and then anoynted with this following Unguent.

Take *Green Hyssop, Ducks fat, of each half an ounce; the pulp of Coloquintida*, Oleum Cheirinum (*or the Oyl of Wall-flowers*) *of each one ounce; Thapsia two drams, Ladanum two ounces; and make an Unguent.*

Or else let the Head be washed with the Decoction of Beets, and the lesser Centaury, adding thereto Vinegar and Honey. Or,

Take *Marshmallow roots, the Leaves of Beets of each one handful; Pulp of Coloquintida half an ounce, Nitre two drams; boyl all in a sufficient quantity of Water, to the Consumption of the fourth part; and in the end add of Wine one pint.*

After the Washing let the Head be anoynted with the following Unguent.

Take *Copperas, and the Gall of a Bull, of each one*

one dram and half; Nitre and Sulphur, of each two drams; Oyl of Roſes two ounces; Mingle them over a gentle fire, and adding thereto a ſufficient quantity of Wax, make a ſoft Unguent.

You may ſee more of theſe Medicaments in the place before alleadged out of *Galen*, and likewiſe in *Paulus Ægineta*, and *Alexander Trallianus*.

Chap. 9. *Of Plica Polonica.*

AND laſtly, among the Vices of the hair, we muſt not in ſilence paſs over that which although indeed not known in all places, yet nevertheleſs may very wel be accounted the chief of them all. It is called *Plica*, to wit, becauſe that in it the hairs are wholly entangled one within another; and by the Polonians *Gvvodzicc*, that is, a Club; and by the *Roxolani* it is termed *Koltun*, which ſignifieth a little Stake or ſmall Poſt; whereupon it is alſo by ſome called *Helotis*. Others call it the Diſeaſe of the Locks; the Germans *Wichtelzopffe*, becauſe they ſuperſtitiouſly conceived, that ſuch like Locks of hair were entwiſted by Infants dying unbaptized (for theſe by the Ancients were called *Wichteln*) as likewiſe, *Marenflecht*, *Marenwirckung*, *Marenlocht*, *Schrotlinſzopffe*, *Indlezoppffe*, becauſe they were thought to be knit and twiſted by ſome *Incubus* in the likeneſs of a Jew.

This Diſeaſe is very familiar, and as it were Epidemical, eſpecially unto the Polonians; inſomuch that Neceſſity enforceth them to ask the advice, and to implore the aſſiſtance of the Phyſitians of *Padua*. I had rather therefore give you the Hiſtory hereof, in the very words of theſe Phyſitians, then in mine own. Now therefore thus writeth D. *Laurentius Starnigelius* (Rector of the Univerſity of *Zamoſcium*, and Profeſſor of Rhetorick) unto the Phyſitians Profeſſors of the Univerſity of *Padua*, the laſt day of October, in the yeer 1599.

Excellent and Worthy Sirs, our moſt dear and greatly to be reſpected Friends;

IN regard of that neer and Intimate acquaintance that we gained (during our Converſe and abode in the loweſt Sarmatia) with you moſt Excellent and Noble Doctors, by reaſon of that common bond and tie which the beſt of Arts had knit between us and your Excellencies; I the Rector of the lately erected Univerſity at Zamoſcium held my ſelf bound to write unto you (my Noble and ever honored Friends, famous indeed and renowned, not only by the antiquity and eminency of the moſt Noble Univerſity of Padua, but alſo far more enobled and dignified by your Learning and Practiſe. The Cauſe of this my writing unto you was given me by the Novelty of a Diſeaſe among us, and the extream difficulty of Curing thereof. My requeſt is, that you the moſt Eminent Profeſſors of the Univerſity of Padua would both pleaſe to read this my Epiſtle, according to your wonted Candor and Courteſie; and likewiſe when you have read the ſame, that you would vouchſafe friendly to write back unto me your Advice and Judgment; of what nature and quality you conceive the Diſeaſe to be, what Precepts you think fit to be given touching the ſame, & what kind of Medicaments you Judg moſt expedient for the removing of the ſame. The Caſe ſtands thus: Betwixt Hungaria and Pocutium (a Province of the Kindom of Polonia) which are diſtinguiſhed the one from the other by Mountains, out of which there break forth divers Rivers, it ſo happened, that very many both Men and Women had one or two Locks growing forth on their Heads, entwiſted and infolded within themſelves inwardly, and entangled together with the hairs nigh unto them, the Lock hereby becoming exceeding very thick: and then indeed it was nothing at all troubleſom. But now this ſame Diſeaſe hath begun to Creep further, and fleeth up and down throughout the whole Kingdom of Polonia, to the great diſquiet and torment of all ſorts of People. It infringeth the Bones; looſeneth the Limbs; infeſteth the Vertebræ of the Limbs; maketh the members round like a Globe, and writheth them back; it cauſeth them that are affected therewith to bunchout; it poureth forth Lice, and ſo filleth the Head with freſh ſupplies of theſe ſaid Lice following one after the other, that it can by no means be freed of them. If theſe Entangled Locks be ſhaven off, that humor and the poyſon thereof ſheds forth into the body, and then (as we wrote before) extreamly tortureth the perſons thus affected; it diſquieteth and troubleth the Head, Feet, Hands, all the Limbs, all the Joynts, and in a word, all the parts of the body. And it is found by experience, that ſuch as have ſhaven off theſe bundles of hairs ſo cloſely entwiſted within themſelves, that theſe have ſoon after been taken in their Eyes; or elſe have been moſt grievouſly tortured with Defluxions unto the other parts of the body. If we attempt to Cure the Party by the uſual purging Medicaments the affected Perſon is the worſe for them; and the tormenting pain rageth ſo much the more; becauſe that the ſaid purgation is not able to maſter and expel the Noxious offenſive humors, but only ſtirs them abroad, and thereby ſcattereth and diſperſeth them throughout the whole body: for (after purging) thoſe that are afflicted with this Peſt are ſo exceedingly tormented with a burning pain of all their Members, that nothing can poſſibly be added unto the ſharpneſs & bitterneſs of the Torture. Women for the moſt part are taken herewith; and likewiſe thoſe men that are inclined unto the French Diſeaſe, as alſo the Children begotten by them

them that are infected with the said Disease: and those likewise who by Repercussive Medicaments have driven back and repressed the Porrigo *of the head (which the vulgar cal* Tinea:*) and moreover, such Women as in the time of their Monthly Courses are not sufficiently purged. Of which Women some of them there have been that in their young and most vigorous age, having had no more than a shew of their Courses, but withal an extraordinary flux of blood from the Nose, these in their declining age (this flux at the Nose ceasing) have fallen into this very disease of the intangled Locks. Some there have been (though very few) who having been for some yeers tortured and afflicted with this kind of Disease, and not at al shaven their heads; and having undergone al the vexation, nastiness, and filthy deformity of this disease (not without extraordinary great trouble, and a most intollerable nauseousness) have at length recovered, upon the falling off of these virulent intangled Locks; but yet nevertheless the greatest part of them perished. Many kinds of Medicaments have been sought for, and made trial of, but as yet there hath been found none that would effect the Cure. The force likewise and nature of the Disease, and the cause thereof, have been sought for; but as yet there indeed appeareth nothing of certainty, touching what we have sought for. The Country Boors give out that they have found great relief by carrying tied about them an Urchin pulled in pieces; and for the total abolition of the said affect, they make themselves a meat of the said Urchin it self; but yet we find that even in this there is not any thing much available. They furthermore provide themselves of a Decoction made of the Leaves of Bears-breech, with the which when they wash their heads, the locks we mentioned before break forth, and withal great store of Lice. This Affect communicates with that fuliginous and sooty exhalation out of which the hairs are bred; and it seemeth to have some affinity with the affect* Tinea; *and by its excruciating and racking the bones, with the French pox; by the great abundance of Lice, with the* Phthiriasis; *by the pain of the Joynts, with the Gout* Arthritis; *and by the miserable contraction of the Members that it causeth, it seems to have some neer alliance with the Spasm. That I may add no more (most worthy and renowned Professors) your Excellencies wel skill'd, and most expert in this kind of Art, wil easily collect, how necessary this deliberation is, and with how great a benefit you shal oblige unto you the whol most vast Kingdom of* Polonia, *when by your deep Wisdoms and Skill you shal have discovered and found out a present Remedy for this kind of Pestilent Malady, with the which it is generally vexed and disquieted in a most violent manner; and when you have found out an expedient Remedy, if you then please to communicate it unto us by your Letters. Many there have been who (as the first Authors and Inventors of various Medicines) live yet even unto this very day in perpetual praise; the glory and renown of this Medicine found out by your excellent and magnifique Wisdoms, shal be properly your own, shal make you famous, and shal for ever flourish in succeeding ages. I expect from you your most friendly and courteous Answer: but if I have not sufficiently (neither yet in fit and proper words, and such as were requisite) expressed the quality and condition of this Disease, I desire of your Excellencies, that you would herein excuse me, a man wholly conversant in another kind of Art. I have presented you with a certain Adumbration of this Disease, and in a manner shadowed forth unto you this Malady; the more interior Nature and hidden parts thereof your excellent Wisdoms by the sharp and quick sight of your knowledg will easily search into, and contemplate. I bid your Excellencies heartily farewel: From* Zamoscium, *this last day of the month of* October, *in the Yeer one thousand five hundred ninety nine.*

And yet notwithstanding there are others that tel us how that this Disease is very common and familiar even in other Regions also. For in the Observations of *Schenckius* we may likewise see, that this Disease was known also unto the *Brisgoi*, and *Alsatians*. For thus *Schenckius* writeth in the first Book of his Medicinal Observations, Observat. 13. *There is* (saith he) *with us at this day to be observed a certain most horrid, uncombed, and most intricate kind of hairie Tufts, both in the head and beard, no whit strange and unusual unto ours; but altogether unknown unto the Ancient Physitians of former times, in what Age soever they lived: with which such as are affected, you may see them have hanging down (from the rest of the hair of their head and beard) even unto the shoulders, breast, and sometimes also even unto the very Navel, very long tufts and bushes of hair, wonderfully intricate, oftentimes a finger thick, exceeding dreadful to look upon, and much resembling the Gorgons head. Which tufts of hair they suffer to grow in a sloven-like and regardless fashion, for some superstitious ends inducing them thereunto; neither wil they at al suffer it to be cut, neither at any time to be parted and severed with the Comb, being altogether perswaded that the most grievous Fomenters of the diseases of the head (that is to say, the matter of the Apoplexy, Palsie, Madness, and especially the pertinacious Cephalalgie, and the like Diseases) are wholly, or at least in great part consumed in nourishing these tufts of hair. And thus being lead either by Superstition, or the long and exact observation of other men, they wil admit of any thing, rather than the kembing or cutting short of these bushy locks of hair, as a thing altogether ominous and deadly; and having*

ving made their Essayes both of Experiment, and History, they stiffly maintain their own Opinion. But those of them that would be accounted more neat and spruce hide these their deformed tufts of hair (those of their heads within their hats, but those of their beards rolled up together under somthing they purposely wear upon their breasts) that so they may not be seen. But there are likewise others of them, who (although it be even in the publique Assemblies) cannot possibly conceal these monstrous and deformed bushes of matted and intangled hair, if they would never so fain; neither would they, if they could. So that it is a thing so wel setled and resolved on (without the least doubt or scruple) in the minds both of those that wear these horrid and strange intangled locks, and likewise of al those that behold them, that even in their publick Assemblies, without any the least shame or disgrace, and as a thing altogether necessary for the sustaining of life, they expose them to open view. And some certain of them there are (as we have already told you) that during their whol life do in this manner nourish and cherish these their ugly locks, hoping that thereby they may possibly be preserved from al other dangerous and difficult diseases that continually threaten them. The vulgar likewise, if they chance to light into the company of any thus affected, they then presently suspect them to be diseased with some hidden, undiscernable, and some one or other difficult Malady of the head. In which thing whether their Superstition convince their Experience, or their Experience exceed and surpass their Superstition, I wil not at present trouble my self to judg thereof. Only this indeed I conceive fit to tel you, That as I incline very much unto the vulgar Opinion; so (that I may conceal nothing) I think also, that the Seminary of these kind of Diseases is not from thence so much argued as nourished, and that by this means it may be prevented that they invade not; as we are likewise further taught by the received Opinion of Physitians, touching the Causes of the generation of Hair, the Events, and the Cures; there accrewing also (for our further assurance) the common and constant attestation of the vulgar, and which at this day passeth (as from hand to hand) among them. I have not as yet found that this vice of the hair is sufficiently known unto other the Europeans; *neither is it known in the most parts of* Germany: *but unto al the* Brisgoi, Alsatians, Dutch, *and in many Tracts neer unto the River* Rhine, *it is in a manner Epidemical; and generally wel known likewise unto the people where I live. I my self knew here above thirty Citizens (of whom some are even yet living) that were famous and remarkable for this kind of hair. The common people cal it* Marenflechte, Maren wirkung, vnd Schrottlinszopff, *as if we should say, The contorsions or writhings of the hairs, or the locks, and hairy tufts of the* Incubi; *for they conceit that the* Incubi *and* Fauni (*as the Ancients called them*) *draw forth these hairs in the night time by sucking them. Others there are that name them* Marenlock, *that is to say, the locks and tufts of Swine, because they now and then observe some long tufts (like unto the former) growing out of the neck of these Swine, and hanging down very low.*

As for Histories, there are two that in special he reckoneth up, the one out of *Johan. Stadlerus*, a Physitian; the other out of *Moccius*; and both of them he relateth in their own words. The first is this. *Thou bringest unto my remembrance that noble person* Casparus *of* Horstein, *Brother unto the Commendator* Sigismund *in* Alsatia, *and Provincial in* Burgundy, *lately deceased; whom when the Commendator on a time sharply reprehended by reason of his uncombed, writhed, and intangled beard, which (horrid and frightful as it was) he ware before him; and withal threatning to remove him from his Table (a man of about fifty yeers of age) unless he would cut it off; he then answered, that he would more willingly be deprived of his Diet, and freely depart the Court, rather than want his intangled and altogether Gorgonean Beard. This happened in the yeer of Christ 1564. when from* Friburg *I went to* Alschusa *for fear of the Plague.* Thus much out of *Stadlerus.*

The other History is thus related: *Of late (saith Moccius) one rashly cutting off these Locks of an old woman, she died within the space of three daies. For they cry up this as a thing very fatal, even unto such oftentimes as for want of good advice have frivolously been hurt: although there are likewise some that tel us another tale. For we know the man who was wel acquainted with a certain Counteß, that having such a monstrous head of hair would often cause it to be cut, even unto the neck.* This out of *Moccius*; and thus far *Schenckius.*

I have heard from a certain Captain of Horse, that this Malady is likewise not unknown unto the *Hungarians*; and that in *Hungary* not only Men, but even the Horses also are subject unto this kind of Disease; and that he himself brought out of *Hungary* as far as *Dresda* a Horse that had such a *Plica* or intangled Lock of Hair, hanging down unto the very feet.

Unto the aforesaid Epistle of the Rector of the University of *Zamoscium*, *Hercules Saxonia* answereth in a peculiar Book, which he entituleth, *de Plica*, or, of the monstrous intangled and writhed Hair. *Johannes Thomas Minadous* hath likewise published the Consultation they had at *Padua* (touching this sad Affect) on the 15. of the Calends of *January*, in the yeer 1599. and he inscribeth it, *de Helotide.* *Rodericus a Fonseca* hath published likewise a Consultation touching this same Disease; the which

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we find in the first Tome of his Consultations, Consult. 1. Al which are to be seen in these before mentioned Authors. But now whether or no the Polonians received any considerable benefit by these Consultations of the Italians, I leave it unto themselves to judg. I think that to be a very Ingenuous Confession, which that most eminent and famous man Dr. *Johannes Prevotius*, principal Professor of Physick in the University of *Padua* maketh in that Letter of Advice and Counsel which he wrote unto the Illustrious and most generous Lord, *Nicolaus Sapieha* chief Standard-bearer unto the great Dukedom of *Lituania*, and Earl of *Coden*, &c. (I shal anon give you the whol Letter at large) where he thus writeth: *The Nature of this poyson* (saith he) *is altogether unknown; so that (as it seems to me) it was truly spoken by that illustrious person, who said in my hearing, that the Boors inhabiting within his Territories had found out more of the original of this* Plica, *the progress and the Cure thereof, than any of those Authors that had written concerning it, of which there hath been never a one of them that as yet hath had the fortune to restore unto perfect health any one that hath been afflicted with the said* Plica. The Physick Professors of *Padua* have indeed made trial there of very many Remedies, but al to no purpose. The same aforesaid Noble person (Count of *Coden*) himself told me, that a certain *Padua* Physitian induced thereunto (as it were) by the signature & shape of the Disease (for they that are affected with the true and perfect *Plica* seem in a manner to have Serpents hanging down from their heads, and as it were the head of the Monster Gorgon) prescribed him some Vipers to eat, but without any success at al. And that another of them had provided him a Psilothrum Oyntment to use instead of the usual Ley, perswading him to condescend unto the cutting off of his hair, promising him an artificial covering for his head; but that being advised to the contrary by a German (a student in Physick) unto whom this Disease was not altogether unknown, and one who wel understood the danger that was like to follow upon the rooting out al his hair, he therefore refused it. But although I dare not arrogate unto my self a perfect knowledg of this Disease; and albeit that in no case we cannot attain unto the perfect and exact knowledg of Diseases that depend upon an occult and secret Cause; yet nevertheless what I know touching the Nature of this Disease (by means of my converse with the Noble Earl before mentioned, who was afflicted therewith) and what I conceive touching the Cause thereof, I wil here briefly acquaint you with, that in so doing I may give a further occasion and encouragement unto such as live in those Regions where this Disease is commonly and familiarly known, to publish what is come to their knowledg touching this Disease.

It seems not to me to be any new Disease. For although it hath hitherto been unknown unto the people of *Italy*, and most of the European Regions; yet nevertheless, I see no reason at al, why it should not be common and frequent in *Polonia* many Ages past as wel as now; since that the causes that produce the same at this day might then be present as wel as now; only that there were then wanting Physitians that might inquire into, and acquaint us with what they knew touching the Nature of this Disease.

Now as for the Nature of it, we are first to take notice of this; to wit, that this Disease (as for what concerns the name thereof) is known indeed from the intricateness and intangling of the hairs: yet notwithstanding that the said *Plica* is only somwhat that is Critical as it were, arising from the expulsion of the vitious matter out of the body; and that the said *Plica* bringeth no danger at al along with it unto the affected person, who oftentimes bears it about with him al his whol life, without any the least damage. But that which most of al threateneth danger unto the diseased party is that vitious humor which yet sticking fast in the body exciteth those most grievous symptoms that have been before recounted in the History of this Disease; which cease al of them afterward, so soon as the matter is thrust forth unto the hair.

And moreover, this is further to be added unto the History, That in such as are thus affected, especially if the Disease proceed unto the height, not only the hairs are vitiated, but the nails also, and more especially in the feet, but most of al in the great Toes thereof, which become rough, long, and black, like unto the horn of a Goat; and this I observed in the afore mentioned noble Lord *Nicolaus Sapieha*; and I have heard that the very same hath also befallen unto others.

But now this Vice is not without cause referred unto and reckoned among Diseases, in regard that the hairs are not wholly to be excluded out of the number of the parts. And it is to be referred unto the Diseases of Conformation, seeing that the hairs neither retain that figure that they ought naturally to have, neither do they every of them appear single and severed, as they should, but are variously complicated among themselves, and entwisted one within the other, so that of many hairs there is made one long, thick, intangled, and frightful lock. And yet notwithstanding that the Distemper of the hairs is likewise changed cannot be denied, in regard that there floweth unto them a preternatural humor, and such like hairs as these when they are cut pour forth blood.

As touching the Causes thereof, in the first place, these things that are commonly believed and by tradition pass from hand to hand, touching the paines that is taken by the *Incubi*, Infants not baptized, and other Spirits besides; in the weaving of the long, ugly and frightful Locks there

there is none but may easily perceive that they are meerly fabulous and superstitious. But that this vice of the hair, as wel as many other Diseases, may somtimes proceed from Witchcraft and Inchantment, appeareth even by the Observation of *Christophorus Rumbaumus*, Doctor and Professor of Physick, and my fellow Citizen, which *Hercules Saxonia* reporteth to be Extant in the Observations of *Johannes Schenckius* the Elder, in the seventh Book, in these very words of *Rumbaumus*. *In the yeer 1590. while I was a long time bestowing my pains (though all in vain) in the Cure of a Mans Wife (who out of the Lees of Beer artificially destilled Brandy Wine at Uratislavia) being newly brought to bed and by reason of a great and sudden affrightment upon occasion of a lamentable fire burning the next adjoyning houses, taken with an Inflammation of the Lungs, upon the retention of her Courses, Secundine, and what should afterward have come from her, and this Inflammation (through her own careleßneſs) terminating in an Impostume of the Lungs, and the Consumption: a certain Emperick (an old Woman) came unto her, and offering her pains promised present help: Which she would by no means admit of: Whereupon the Emperical old Woman growing much enraged, & uttering many threatning words, she causeth her to be shut out of doors; and then presently (as she was wont) she fals a washing and Cleansing away the filth of her Head (having first Combed, plaited, and dressed up her hair somwhat long, as her custom was) with warm ordinary Spring water. But upon the very first pouring on of the water all the Locks of one side of the Head, as it were all besmeared with Birdlime, become on a sudden so intricate and intangled, that afterward (as long as she lived) they could by no means, wit, or device, be extricated and severed as formerly; but continued thus in long entangled Locks, very frightful to behold, even unto her dying day. And this we conceive to be wrought meerly by Witchcraft.*

But I think this to be very rare; and that this Vice proceedeth from some internal Cause we are taught even by this, that in those places Bruits likewise are taken with this affect. But now what kind of humor that is, we shall find it very difficult to explain. Very many there are (and indeed the most) who refer the Cause of this malady unto a certain viscid and slimy humor. But these fal short of the truth. For in many bodies, and many Regions likewise, these viscid Clammy humors are generated, which yet notwithstanding produce no such Disease. For neither may these pains of the Limbs, Convulsions, and other Symptoms, be referred only unto a viscid humor; neither can any reason be rendered, why this matter should be thrust forth only unto the hairs, and unto no other parts. But what the Nature of this humor is, the nourishing of our body and the generating of other Diseases, may in some measure instruct us. For although all the parts are nourished by the blood; yet nevertheless, as divers Plants do from the same Earth attract (each one of them) that Aliment that is proper and familiar unto them, as *Hippocrates* testifieth, in his Book *de Natur. human.* Text. 31. even so likewise out of the same Mass of blood contained in the Veins, every one of the parts attracteth unto it self that Nutriment that is most familiar unto it. It happeneth moreover that if the blood be less pure, that excrementitious aliment is carried more unto one part then unto another. And this is plainly to be seen even in the Joynt-Gout (*Arthritis*) where that same serous wheyish matter, salt, and tartareous (or cal it how you please) is carried more unto the Joynts, then to the fleshy parts. A proof of this we have likewise from the stone *Osteocolla* (which is very fitly administred in the fractures of the Bones) where we find that the very bones themselves attract unto them the said Stone; so that it is by experience found, that from the overmuch use thereof there have grown forth Callous substances extraordinary great, and unsightly: of which see *Gulielmus Fabricius*, in his first Century, and Observat. 91. And therefore I am of Opinion, that in those places where this Disease is Epidemical, the fault is in the Genius of the place, and in the Waters, which flow down from the mountains of *Hungary* into *Polonia*; (and in *Bisgoia*, if this Disease be likewise familiar in that Region, from the *Alps*:) which supplieth unto the hair an abundant Nutriment, but unto al other parts of the body such an aliment as is altogether unuseful, and which is worse, very hurtful; which when Nature expelleth unto the hairs, the rest of the body is thereby freed from all other grief whatsoever, and the hairs alone become vitious. And I am the more confirmed in this my Opinion by what was related unto me by the aforesaid Illustrious Lord Count *Nicolaus Sapieha*; that he knew a Boor in *Polonia*, that by bathing Cured such as were troubled with this Disease: by the use of which the first seven daies the sick persons became very hairy all their body over, the hairs breaking forth in all parts; which (upon continuing the use of the same Bath for seven daies more) fell off again, and so the Diseased persons recovered their health. And indeed that some Waters have in them an extraordinary and admirable virtues will every where appear unto us in the Writers of Naturall History. So in the *Alpes*, *Styria*, and *Carinthia*, by the fault of the Water, the Tumors, *Bronchocelæ* and *Strumæ* (we cal this last, being a swelling in the Neck, the Kings Evil; the former being a swelling in the throat) are Natural and as it were bred together with the Inhabitants, the vitious matter being thrust forth unto the Glandules in the Neck, and into no other places.

And yet nevertheless, I would not have it thought that I do hereby altogether exclude the Air.

Air, which it must be confessed hath likewise a very great power in altering our bodies; and it causeth that in these, or those Regions and bodies, these or those humors are generated. Although it be likewise true that the said Air hath not this power from it self, but that it receiveth the same from those vapors that are lift up and raised from the Waters, and out of the Earth which the Water washeth upon, and passeth through. And for this reason it is, that this Malady is not general and Universal throughout the whole Kingdom of *Polonia*, but only familiar unto some certain places thereof, in regard that it alwaies spreadeth and rageth there, and yet is not from thence dispersed into any other Regions; and this Disease *Hercules Saxonia* acknowledgeth to be Endemick; but he wil by no means have it to be Epidemick; as we may see in the tenth Book of his Practice of Physick, and Chap. 7. of *Plica*. But we have already told you (in the second Book of our Institutions, Part 1. Chap. 11.) that he did not wel understand, and therefore could not rightly describe unto us the Nature of a Disease Epidemick and Endemick.

Now the said Matter is carried unto the hair, not (as some would have it) in the form of vapors, but together with the blood it self; which as it is of all other parts, so it is likewise the Nutriment of the hairs, as we told above in the tenth Chapter. Which appeareth even from hence, that the hairs in the *Plica*, if at any time they be cut, they yield forth blood. That (notwithstanding what hath been said) there are now and then some certain persons even in the neer neighboring Regions that are likewise troubled with this Disease, this may possibly proceed, either from the natural neer allied Genius of that place; or else from the Parents. For look as Arthritical persons beget the like; so also it is not impossible, but that those which are affected with the *Plica* may transfuse into their Issue a vitious disposition unto the generating of the same Disease; and Experience teacheth us the truth of this. The Son of the aforesaid Lord, Count *Sapieha*, when he was six yeers of age, had at the first some few intangled Locks of hair among the hairs on his head; and the same hath also happened unto others. I knew a Souldier (an old man) that had a *Plica* in the hinder part of his Head; who being demanded as touching the Cause of the Disease (for he was a German and born at *Thuringia*) replied, that this Disease was hereditary unto him; for his Mother (as he said) had seven of these *Plica's*, two Ells long, all her life long, even unto her dying day. The same Man related this likewise for a truth, that being a Souldier in *Hungary*, and taken prisoner by the Turks, his Master (according to the custom of that Nation) caused all his hair, and withall this *Plica* of his, to be cut off; and that he thereupon became blind: but that having by an Interpreter acquainted his Master with the Cause of this his blindness, and obtained of him that his hair might be suffered to grow forth again, he afterward recovered his sight.

Signs Diagnostick.

There is no need at all, that we add any more Signs; since that there wil appear signs sufficient from the History of this Disease before recited. But that we may in few words give you the Causes of those things that happen in this Disease; in the first place, if that said matter of this Disease (whether it be malignant, or whether it be simply unfit for the nourishing of all other the parts besides the hairs) be abundantly heaped up in the Veins, it is then by Nature (unto whom it is burthensom) thrust forth from the more Noble unto the Exterior parts; whereupon the bones are much damnified and diminished, the Joynts loosned, the Head, Feet, and Hands, and all the Limbs and Joynts infested with pain, Convulsions excited, and the Members contracted. But if Nature be so strong as to get the Mastery, she at length thrusteth forth the said matter unto the hairs, and more especially those of the Head, with the which this Matter hath a very neer alliance (as in such as are Arthritical, the Cause of the Gout *Arthritis* hath with the Joynts) whereupon Dandrif like unto Bran and Lice are abundantly generated in the Head, and from the over-great store and luxuriancy of the Matter the very hairs are Complicated and intangled within themselves, so that they cannot be separated by any Art or Labor; and being Cut they likewise pour forth Blood.

Prognosticks.

1. This very Malady, unless the matter be thrust forth unto the hair, is sufficiently dangerous; so that there are most grievous pains and Symptoms excited, almost in all the parts whereunto the matter is thrust forth, as we told you but even now.

2. But if Nature doing rightly as she should, and as it were by a *Crisis* thrust forth this matter unto the hairs, then indeed this Vice of the hair that we are treating of is excited, but the Party is altogether preserved free from other Maladies; since that Nature is wont to thrust forth unto the hair whatsoever there remaineth of this like vitious matter in the body; and many with such like Plica's live very healthfull all their life long.

3. But if such *Plica's* be at any time rashly cut off, blindness, and other most grievous Maladies are from thence excited. Neither is this a Fable; but experience it self often teacheth us the truth hereof; as the Example even of that Souldier of whom we made mention before in the Causes may sufficiently instruct us. And this happeneth not (as many conjecture) because that these Plica's being Cut, the Head is thereby exposed

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unto the cold Air, (for this may eaſily be prevented by a hat, or ſome other covering put upon it) but becauſe the place into which Nature was wont to thruſt forth the vitious humors is taken away, and a paſſage forth denied unto the matter, and the Evacuation thereof hindered. And the ſame happeneth here, as in old inveterate Ulcers: for theſe may not be healed without extream danger, unleſs the body be firſt wel purged and cleanſed; and like as iſſues alſo, after they have for a while been permitted to run, are not without much peril to be ſtopt.

4. If nevertheleſs there be no more of this vitious matter left remaining in the body, then after ſome time thoſe very *Plicæ* fal off of their own accord; and therefore alſo there remaining now no more of the ſaid matter in the body, which I confeſs is a thing very hard to know, it may be ſafe enough (without any danger at al) to cut off theſe *Plicæ* with the reſt of the hair.

The Cure.

I conceive that the perfect Cure of this Diſeaſe is altogether unknown. Which without doubt proceedeth from this, that in thoſe places of *Polonia* where this diſeaſe is Epidemical, there have hitherto lived but very few Phyſitians that were able to compoſe an artificial Method out of thoſe things they might come to know from the vulgar, touching this Diſeaſe, and the Cure thereof.

This in the firſt place is certain, That Purgations and letting blood avail but little in this Diſeaſe; yea, that they are oftentimes hurtful. For ſo the Rector of the Univerſity of *Zamoſcium* writeth unto the Phyſitians of *Padua*: *If we attempt* (ſaith he) *to cure this Diſeaſe with the uſual Purgations, it maketh it but ſo much the worſe, and to rage ſo much the more; in regard that the Purgation is not able to overcome and maſter the noxious humors, but only to diſperſe them throughout the whol body when they are thus moved: for thoſe that are affected with this peſtilent Diſeaſe do thereupon burn with ſo great a pain of al their Members, that nothing more ſharp can poſſibly be added unto the ſharpneſs and bitterneſs of their torments.* And the ſame is confirmed by *Herculeſ Saxonia*, who in the place alleadged, out of the Epiſtle of a certain noble Matron, a Polonian (who was troubled with this Diſeaſe) writeth, That the ſaid Matron upon the opening of a Vein in the Arm, was immediately taken with moſt extream and intollerable pains in the ſame Arm, together with an œdematous Tumor: and likewiſe that for the very ſame reaſon, a Vein being opened in the Feet, there were moſt ſharp and bitter pains excited in both her Thighs, as low as the Ankles. The ſame *Herculeſ Saxonia* in the ſame place, writeth, That a certain famous and eminent Captain, a Polonian (*Joachimus de Ociesno* by name) told him, that he had ſeen many that were blind, and ſome that were lame, and others otherwiſe affected, who having had Purgations adminiſtred unto them in the beginning, fel into theſe Affects. And the very ſame happeneth alſo in the Scurvy; the Symptoms whereof are for the moſt part exaſperated by the uſe of Purgers.

It wil therefore be the ſafeſt courſe (ſtil taking Experience for our Guide) to uſe the utmoſt of our endeavor that the ſaid vitious matter may with al poſſible ſpeed be drawn forth unto the hairs, whither it is now tending. In which it wil be likewiſe our ſafeſt courſe again to follow the guidance of Experience; by which it manifeſtly appeareth, that thoſe Lotions that are made of the Plant we commonly cal Bears-breech, is very available and ſucceſsful in this caſe.

I confeſs indeed it is altogether unknown unto me, whether the ſame may be performed by inward Medicaments. But yet the very mentioning of Bears-breech brings unto my remembrance a certain Drink (no doubt at the firſt brought thither out of *Polonia*) that was much in uſe in my Country, in the City *Uratiſlavia*, and it is made of Bears-breech: the vulgar cal it by the common Polonian name *Barſicz*, or as the Germans pronounce it *Barkſch*; which thoſe that are Feaverish, and eſpecially the great Drinkers after their exceſſive Cups the day before, uſe in their Broths, and in their ordinary Drink, to aſſwage their thirſt. Now it is made in this manner. The Leaves of Bears-breech dried are boyled in a ſufficient quantity of Water; that the Decoction may get only a yellow, and not a purple color. Unto the Decoction there is added a little Leaven, or Bread twice baked, made of the Pouder of Bears-breech, with the four Leaven of fine white Bread; and then for ſome certain daies ſet in a warm place, where it gets a boyling heat and fermentation, until ſuch time as it hath contracted a taſte ſomwhat tart and ſour. But now whether or no this kind of Drink hath a power of doing any thing toward the expulſion of the matter in this Diſeaſe, we are to conſult with Experience. And it is their part who live in thoſe places to make publick thoſe Medicaments that uſe hath taught them to be fit and profitable, that ſo al their Experiences being conferr'd together, there may at the length be compoſed a Method of Curing this Diſeaſe.

But in regard that the *Plica* hath ſome ſymptoms common with the Scurvy (ſuch as are the pains of the Limbs, Cramps, and the like) and that the aforeſaid illuſtrious Count, *Nicolaus Sapieha*, was affected with both thoſe Diſeaſes, I think it not amiſs therefore here to place the Hiſtory of his Diſeaſe; which wil add ſome light unto what we but even now ſpake touching the *Plica*; and to what we have likewiſe before, in the third Book of our Practice, written concerning the Scurvy.

The History of the Disease of that Generous and Illustrious Lord, Count Nicolaus Sapieha, *Earl of* Coden, *Chief Standard-bearer of the great Dukedom of* Lituania, *&c.*

This Illustrious Count (without doubt) contracted this his Disease of the *Plica*, in his own Country, from the same common cause from whence the vulgar have it: but as for the Scurvy, he got it from the many Errors by him committed in his Dyet, during his various & troublesom Journeys throughout almost al Europe, and from the Quartan Feaver that followed upon the same. For when in the heat of Summer (as himself related the story unto me) he had travelled over the Pyrenean Mountains, out of *France* into *Spain*; and in this his Journey had drunk good store of Wine (out of bladders) that was corrupt, and ful of Vermin, the Autumn following in *Spain* he fel into a Quartan Ague. The long continuance whereof having made him impatient, and being quite tired out with the tediousness of a Methodical Cure, he committed himself unto a certain Soldier for Cure: who took some certain Cups of the strongest Spanish Wine; and into the same he puts the pouder of al sorts of sweet Spices; and this Wine he gave him to drink, not only to satiety, but even to Ebriety, until he had made him almost drunk; by which he kindleth within him a continual Feaver, which indeed lasted not long, and quite took away the Quartan; but yet nevertheless imprinted such a Dyscrasie in his Bowels, and humors, that shortly after the Scurvy followed thereupon. With which being grievously afflicted at home in his own Country, and yet notwithstanding so that he could not wel tel what the disease was, he made a Journey unto *Padua*, and there he committed himself for Cure unto the most Eminent Physitians of that University. But yet he recovered not that health and strength that he had expected, and hoped for; and thereupon he is sent back again home into his own Countrey, with this following *Consilium*, which we may term, a Direction, Advice, or Counsel.

The Advice of that most Famous and Eminent Doctor, *Johannes Prevotius*, Chief Professor of Physick in the University of *Padua*.

TOuching the manifold Diseases that this Noble person lieth under, it is neither my purpose at large to treat of them (since that I am not ignorant that they have already been discoursed of by some of the most Eminent Physitians in their long and learned Disputes:) neither indeed wil either the state and condition of mine own health (not yet sufficiently confirmed) permit the same; nor likewise the health and safety so much desired by this illustrious person, for whom I conceive that help and assistance is far more requisite than words and tedious Discourses. I shal therefore with al brevity state and determine the whol case, and ingenuously declare unto you my Opinion touching the same; not that I may interpose my Judgment in opposition unto the Opinion of these grave and learned men; but that I may in some measure gratifie the request of this eminent person, and (if I may any waies possibly be serviceable unto him in procuring his health) that I may not in the least be wanting in the discharge of the Duty and Office of a Christian. It seemeth therefore unto me, that this illustrious Lord is disaffected with a twofold kind of Diseases; the one of them most manifest, depending upon Causes that are commonly known and confessed: the other occult and secret, the Causes whereof are as yet obscure; neither seem they hitherto to be sufficiently expressed by any. There is manifestly appearing a Catarrh of matter that is thick, tenacious, white, oftentimes insipid and tastless (and very rarely sharp and biting) flowing and falling down unto the parts of the mouth, and sometimes also unto the stomack. There is moreover an extraordinary pain of the lower belly, returning afresh after long intervals and Cessations, with an astriction and costiveness of the belly, and a certain grievous and painful sense of extension and stretching about the Region of the Navel, of the Hypochondria, especially the left, and sometimes also of the Loyns; which indeed is wont in great part to cease upon the plentiful Evacuation of the Wind, and a snotty kind of Excrement that comes from him. To these we may add the Nephritick distemper, and want of rest and sleep; this latter being indeed very familiar and frequent with him, for he usually passeth many whol nights together without sleep; and the former, to wit, the distemper of the Kidneys, hath now of a long time sorely troubled him, with a redness and heat of his Urine, and excretion of sand and gravel with his water. The causes of al which Maladies it is most manifest that they are derived from the evil constitution of the internal Bowels, and the excrements of several sorts from thence arising. For the Brain being overmoist (not without much weakness of the innate heat, contracted by reaton of a great wound he received in it at *Paris*) engendereth much flegm, there being added unto al this, in a special manner, the consent of the natural bowels; sometimes the Liver by its heat elevating many vapors; and sometimes the stomack naturally cold, and affected likewise with an Adventicious humidity, corrupting with a more crude

crude juyce the aliment of the whol body, and filling the head; and then withal the Spleen and obſtructed Meſentery ſending upwards many fumes. So that the flegm heaped up in the head, partly by its great plenty, and its own weight, maketh it ſelf a way and paſſage unto the parts lying underneath; and partly thruſt forth by the ſtrength and act of the expulſive faculty it ruſheth unto the mouth and ſtomach, looſeneth the teeth in the Gums, and beſides exciteth and cauſeth very much trouble and pain in the ſwallowing. The ſame (being much encreaſed in the ſtomach, by reaſon of its own proper diſtemper) cauſeth in him the loſs of his Appetite; and from the agitation and weakneſs of the heat it produceth extream windineſs; as alſo a pain of the Inteſtines, with a Coſtiveneſs of the belly, by reaſon eſpecially of the hindered contraction of the tranſverſe fibres diſtended by windineſs; by which ſaid Contraction the deſcent of the Dreggs is very much furthered. But the hotter habit of the aduſt blood, and both the Cholers, ariſing from the Liver and the obſtructed places, greatly diſturbeth his ſleep, eſpecially in the night time; by which it cometh to paſs that from the retiring of the Spirits and the blood unto the internal parts the Evaporations become ſo much the greater. Neither is it any wonder at al that ſomtimes likewiſe there is kindled a Feaver, not only an every day Feaver by reaſon of the vehemency of the pain, but alſo a Periodical Feaver reſembling the Nature of a ſpurious Tertian, in regard that the obſtructions being ſomtimes augmented, great ſtore of excrements (and thoſe very different one from the other) of al ſorts, mingled together one with another, are very eaſily corrupted. And moreover alſo the ſmal ſand and gravel may very wel happen to grow together from this manifold filth communicated unto the over hot Kidneys, and there retained, by the waſting of the more thin parts by the extraordinary great heat; and the Nephritick pain may likewiſe be generated by the abundant matter impacted in the Ureters, and not having an eaſie and ſpeedy motion.

But of the occult and hidden Diſeaſes, ſome of them are ſimply ſuch; touching the exiſtence whereof we may very wel doubt: and others of them are occult only in regard of their Eſſence and Nature; ſince that it is not in the leaſt to be controverted, whether or no this illuſtrious Lord be afflicted with them; a truth ſo obvious and manifeſt. Simply occult is that Witchcraft, of which this illuſtrious perſon hath very rational and probable grounds to ſuſpect that it hath been practiſed upon him; in regard that (as he relateth) there have been often found in his bed ſtrange and admirable Magical Figures, of Bones, of Wax, and of other matter; as alſo ſuch like Signs and Characters as Enchanters and Wizards are wont to abuſe in deſtroying thoſe they bewitch: and in regard likewiſe that he had moſt powerful and moſt implacable Enemies, by whom he doubteth not but that his ruine and deſtruction hath by al kinds of wiles, wicked arts, and inventions, been attempted. Since therefore it is confeſſed by al that by Witchcraft bodies may in a various manner be changed; and that thereby there often happen the very ſame effects that are wont to follow likewiſe upon the natural motions of the humor in the body ill affected; hence it is that Phyſitians can have no proper ſigns whereby they may conſtantly diſcover, and abſolutely determine whether there be any Witchcraft practiſed or not. And this is now altogether the caſe of this moſt illuſtrious perſon. For there is none (I ſuppoſe) unleſs he be either a mere Dolt, or one that hath no good opinion of Chriſtian Philoſophy, that will dare to doubt whether or no the related ſuſpicions may not frequently accompany Witchcraft; ſo that hereupon that there is in this preſent caſe no practice of Magick and Enchantment, can by no evident Argument poſſibly be convinced. But if haply any one ſhal object and ſay, That the aforeſaid doubt is altogether needleſs and impertinent, ſince that al thoſe Accidents that the Patient ſuffereth may very wel be referred unto the various, and thoſe likewiſe ſufficiently manifeſt vices of the humors; let ſuch a one know, that ſuch as are variouſly affected from a ſupernatural Cauſe, although the effects proceeding therefrom may ſeem to be natural; yet notwithſtanding they cannot by the aid and aſſiſtance of the Phyſitians ſo eaſily be corrected and kept under, as thoſe may that are vitiated, and derive their depraved power and violence from ſome Natural and ſenſible Cauſe: ſo that, albeit the knowledg of Witchcraft maketh not much for the attaining of the next and immediate Cauſe of the Diſeaſe; yet nevertheleſs it helpeth very much in foretelling the facility of the Cure, and preſaging the iſſue and event of the Diſeaſe. I would to God that this noble perſon were altogether free from this infection; which doth indeed render the Cure of the Diſeaſe moſt pertinacious in al reſpects, and moſt intricate and difficult. But there are two other occult Maladies, with the which I plainly affirm that this noble perſon is affected, to wit, the Scurvey, and the *Plica*; the Nature of which Maladies as it is abſtruſe, and hitherunto never ſufficiently demonſtrated by any, ſo the accidents therein happening are moſt manifeſt. And in very deed (that ſo for brevities ſake I may paſs over the many other notes and ſigns) al men generally acknowledg and confeſs, that the *Plica* ariſeth from the inexplicable and intangled Locks of the Hair; but yet they are altogether ignorant of the proper Cauſe thereof, although they ſpeak ſomwhat that is probable touching the common Cauſe which yet nevertheleſs cannot be ſufficient for the conſtituting of the perfect Cure of the ſaid Malady. But certain it is, that theſe hairs are conglutinated, frizled, and entwiſted from ſome dull and ſluggiſh excrement of the third Concoction of the head, ſweating through the Sutures and Pores; which being

restrained and kept in by the cutting off the hair, the Air more freely getting into the said open pores, there ensue thereupon most grievous Accidents. It is also certain that by the drinking of vitious Waters, or else from exhalations mingled together with the Air, after a long abode and continuance therein, this Malady may at length be contracted; and therefore it is that this evil is almost Epidemical unto the Inhabitants of those places that abound so much with these like Fountains and Rivers that are so wel known unto this noble person. Neither can it be doubted, that such as have weaker heads, are sooner and more grievously infected. But of what kind that excrement is, and with what poyson infected, that seemeth a thing altogether occult and hidden; as likewise for what reason it doth infest the head rather than any other parts; and why in tract of time it vanisheth of its own accord, but yet wil not in the least yield unto those Remedies that cal it forth, and such as we cal *Alexipharmaca* or Counterpoysons; and lastly, from whence it obtaineth that notable and altogether to be admired power of Conglutinating. For neither can these be referred unto the manifest qualities of any one humor (the first or second) although true it is, that according to the generating of these depraved humors more or less, the evil may possibly creep more or less, and be more or less confirmed. This may wholly be said (which is likewise usual in the explaining of al other poysons) that those Waters, and the exhalations thereof are infected with a poyson endued with this property that it is more annoying unto the head, is fixed more pertinaciously unto the root of the hairs, bindeth them together most strongly, and wonderfully writheth them, and most obstinately resisteth all kind of Remedies whatsoever, by reason that the peculiar nature and generation of this poyson is altogether unknown, insomuch that this Noble man seemed to have said but the very truth unto me, that some Boors there were within his Territories that had discovered more of the original of *Plica*, as also of the progress, and Cure thereof, than those Authors that had written concerning the same; none of which have as yet been so successful, as to restore unto perfect health any one that hath been afflicted with this *Plica*. But for the Scurvy it is to be esteemed a far more grievous Malady, in regard that it creepeth into the whol blood; and the corruption thereof prevailing and getting strength may at length cause death unto the party therewith affected; which the *Plica* if let alone without cure, and not medled withal, never yet did unto any. So that this Noble person is not without good cause very much perplexed and troubled as touching this his Malady, being in good earnest grieved, that there is hardly any regard had unto this Affect in this City; where there hath scarcely ever yet been seen (at any time) any one infected with the Scurvy. And I (for my own part) although I have seen two Hollanders and one English man (both at *Venice*, and at *Padua* also) al three of them affected with an exquisite Scurvy, yet I neither expect nor desire that any Credit should be given unto what I say; but yet notwithstanding from what I find written touching the Scurvy by *Forestus*, *Eugalenus*, and *Sennertus*, most truly, and according to what they had seen, and found attested by many Histories, I shal presume (and that very confidently) to affirm that this illustrious Lord is at present much afflicted with the Scurvy. For excepting only the swelling of the Lips, and the flagginess of the putrid Gums (the Accidents of the Scurvy confirmed) al other signs and tokens of the Scurvy are present; to wit, the much and long use in former time of salted and smoke-dried flesh, unto which the Soldiery in the Septentrional parts are extreamly addicted; add unto this the loosness of the Teeth, with some kind of itching in the Gums; the continual great lassitude and weariness of the parts, and especially of the internal; the extension of the left *Hypochondrium*, and the Mesentery; and the broad Efflorescencies, one while wan, and other whiles red, budding forth continually here and there throughout the whol body without any Feaver; which is conceived to be a Pathognomick Symptom of the Scurvy. Unto this we may add, that this illustrious person about some three yeers since was apparently affected with the Scurvy, and that the Physitian who then had him in cure (being most expert in the knowledg of the Scurvy) told him plainly and freely at his departure, that the reliques and remainders of the Scurvy were not in the least to be sleighted by him, but upon al occasions opportunely to be prevented. But perhaps the Italian Physitians do therefore sleight and but little account of the name of the Scurvy, in regard that they are of opinion that al the aforesaid accidents may be al of them referred unto those causes that are evident, and not called by unusual names, and such as in former times were not so much as ever heard of. For the redundance of the adust Melancholy which is much defiled with Ichores and thin Excrements (which said redundance of Melancholy and other the said humors, that they are at present to be found in this illustrious Lord, is manifestly shewn by the boyling heat of his Liver, the weakness of the Spleen, the familiar flux of the Hæmorrhoids, and the frequent use of meats salt and earthy) may possibly breed and produce a lassitude, and lumberness, but more especially in the internal parts, unto which the humor by its weight and heavines naturally tendeth. Unto al this it may be added that it much impaireth the strength and natural powers, enervates and weakens the body, and extenuateth the same by corrupting the Aliment; it extendeth likewise the Natural Bowels by its great plenty and thickness, and obstructeth the same by the admixture of the diffused Ichorous Excrements with the overhot blood. Neither are we at al to wonder that various spots arise, since that both by its own proper thinness that

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more hot part of the aduſt humor is eaſily carried forth unto the outſide of the body; and that (the expulſive faculty of the internal Bowels being irritated) it is no hard matter for it to be purged forth through the looſe skin, being porous and weak. And therefore to me there ſeemeth to be no cauſe why we ſhould abuſe the new and unuſual name of the Scurvy in the explaining of things ſo wel known. But how many ſick perſons have been moſt miſerably caſt away through this kind of reaſoning, we may every where read in thoſe Authors that have written touching the Scurvy; who all of them with one conſent affirm, that never any yet being affected with the Scurvy, and having had adminiſtred unto him only theſe remedies that have acted by a manifeſt quality, and ſuch as were proper to evacuate and temper Melancholy aduſt, and to take away the obſtructions of the Bowels (although adminiſtred by the moſt able and expert Phyſicians) was thereby perfectly cured; in regard that the Melancholy blood (in this Diſeaſe) contracteth a corruption peculiar, and ſuch as cannot wel be expreſſed; which ought to be removed and taken away by thoſe Alexipharmaca that are fit and proper for it, and that otherwiſe irritate and enrage aduſt Melancholy, if we regard the manifeſt qualities. For Spoonwort, or Scurvy-graſs, Water Pimpernel, and certain kinds of the Creſſes and Water Parſley (al of them being moſt ſharp, and unto which alone the Scurvy giveth place) ſeeing that they attain unto the third degree of heat, and greatly dry, they would vehemently increaſe the vices of the aduſt Melancholy, and al the cauſes thereof, unleſs by their Alexipharmick quality they oppoſed the corruption of the Scorbutick blood. And that the ſaid effloreſcency of the ſpots in the Skin are the Concomitant of this Corruption, wil be demonſtrated even by this, That in thoſe other Meridional Regions, in the which aduſt humors do oftentimes ſway and reign, ſuch like effloreſcencies do not at al appear without a Feaver. Seeing that therefore the name of the Scurvy deſigneth and pointeth out unto us ſomthing that may be uſeful in the Cure thereof, it is by no means to be exploded, as unuſual and altogether unheard of by the Ancient Phyſicians, unto whom the name of *Plica*, of the French Diſeaſe, and the Meaſels, was alike unknown. Now if this be ſo, this illuſtrious perſon may very wel conceive ſome hope of the recovery of his health (in regard of his Catarrh, pain of his belly, and want of his reſt) from the help and aſſiſtance of the Italian Remedies: but I muſt profeſs that I underſtand not what is likely to do him any good in the Cure of *Plica* and the Scurvy wherewith he is alſo affected. The Remedy of the *Plica* is altogether unknown; and this illuſtrious perſon knoweth, that hitherto there was never any yet (either here or elſewhere) perfectly recovered of this Malady by the help of the Phyſicians though never ſo able. And what this noble perſon hath ſmal hopes to expect from Phyſicians, he may perhaps within four or five yeers attain by the benefit of Nature; ſince that it hath been obſerved, that men grown have in the fourteenth or ſeventeenth yeer been wholly freed from it, the *Plica* falling off of its own accord, and never after more appearing. But *Italy* wanteth *Alexipharmaca* for the Scurvy, into which if any chance to be brought, they wil hardly be preſerved above one yeer. What is therefore to be done in this Caſe? This alone, to wit, That (for very good reaſon) he perſiſt in the Cure as it is already begun (which may corroborate the Stomach, dry the Head, and draw forth unto the outward parts the virulent excrement of the *Plica*, by the help of a Decoction, and the external uſe of Bath-waters, as alſo by the dropping of hot Oyls upon the ſtomach) until the latter end of *April*, or the beginning of *May*, if at leaſt he be able ſo long to endure and bear the ſtrength of theſe extraordinary drying Medicaments. But then let him wholly apply himſelf unto the Cure of the Scurvy; that is to ſay, let him uſe the Decoctions of the opening Herbs, mingling therewith that quantity of the Alexipharmaca that the Phyſician wel exerciſed in this kind of Cure ſhal judg fit and convenient. But in the general, the cure of the Scurvy is more eſpecially to conſiſt in this, That thoſe things that open obſtructions (the choice whereof is to be left unto the judgment of the Phyſician that hath undertaken the Cure) are evermore to be tempered together with the Antiſcorbutick Remedies. For which cauſe I judg it fit and very requiſite that the Patient with al poſſible ſpeed make a Journey into the Northern parts, that ſo he may find the Herbs yet flouriſhing, and ful of juyce. For the general opinion is, that the Antiſcorbutick Herbs benefit more by their Juyce than by their Decoction, or any other way whatſoever. Let him have recourſe unto *Daniel Sennertus*, the moſt eminent and famous Phyſician of our Age, and one moſt exerciſed in the knowledg and Cure of the Scurvy: let him wholly commit himſelf unto his Care, and be ruled by his advice, and in ſo doing (next under God) let him expect his recovery from this moſt dangerous Malady from him alone. He liveth at *Witteberg*, where the Antidotes againſt the Scurvy are known very familiarly. Now if ſo be that before Winter he ſhal appoint him again to make uſe of the Hydrotick Decoction for the Head, (for the ſtrengthening of the head, and belly, and the drawing forth of al thick excrements whatever) this I judg to be very beneficial and conducing unto the haſtening on of the ſpontaneous and voluntary Cure of the *Plica*. His Liver though it ſeem to be extreamly hot, and to require extraordinary cooling Medicaments, yet notwithſtanding it wil be far more ſafe in the hot Summer time to uſe a cooling Diet, than any cooling Medicaments: for the Stomach being but weak and fleſhleſs by the uſe of theſe ſaid Medicaments may eaſily be deſtroyed; and it is likewiſe obſerved that the *Plica* is but the more enraged by the uſe of

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refrigerating Medicaments. And this (most Excellent and Illustrious Doctor, and my very good Friend) is that which I thought fit to write back unto you, for the satisfying of your request. I have purposely forborn the mentioning of the Remedies, in regard that all such as were to be taken in *Italy* have already been most prudently prescribed unto the most Illustrious Patient, and to my knowledg have continually been made use of, and without any, or very little change made therein, continually practised by him: and as for such as shal henceforward be prescribed for him (in *Saxony* or elswhere) for the Cure of his Scurvy (the State and Condition in which this Illustrious Person shall then be found to be after all the toyl of his Journies being first throughly discovered, and a triall made of the Cure yet further to be continued) they are in a various manner to be accommodated unto the necessity of his body; neither may they indeed (without much arrogance) be so much as hinted unto one so expert as your self. God Almighty Grant that the Desires and Travels of this Illustrious Person may find happy Issue and success.

Thus far the Advice and Counsel of *Johannes Prevotius*, in Answer unto an Italian Doctor, on the behalf of that Noble Lord, Count *Nicholaus Sapieha*.

But the Patient returning home unto his own Country, and finding no alleviation of his Disease, but that it rather from day to day grew worse, following the advice of that eminent Physitian Dr. *Prevotius*, writeth Letters unto me from *Codma*, 28. day of *May*, in the yeer 1628. wherein he acquaints me with making a Journey unto *Witteberg* for his healths sake. But when his Kinred and Friends (by reason of so great weakness of his body disswaded him from the Journey, as thinking that he would never come hither alive, he deferred his Journey until the Autumn following. But when he perceived his Disease daily to encrease upon him, he at length provides himself for his Journey; and in the month of *November* the same yeer, being carried in a Horse-litter he took his Journey through *Polonia* and *Silesia* (about a hundred German miles) and came hitherunto me at *Witteberg*, but almost half dead. For he hung together (as it were) only by Skin and Bones; being not able to move Hand or Foot, no not so much as his Head. But I had rather relate the History of his State & Disease in the Words of his Domestick Physitian, which he had brought along with him out of *Italy* (that famous and Eminent man, Dr. *Franciscus Mistruccius*, Doctor of Physick at *Forojulium*) then mine own; who gave me an account of the Disease of this noble Lord, describing it in the manner following.

Among those many remarkable and famous things wherein Antiquity flourished, and was of old much admired for, this Custom of theirs (most excellent Doctor) was evermore held to be one of the most famous and laudable, that they made Journeys somtimes as far as unto Delphos, *that they might there receive an answer in doubtfull Cases from the Oracle of* Apollo Pythius, *an Oracle much fam'd all the World over. After the manner of these Ancients this Generous and most Illustrious Count, my* Lord Nicholaus Sapieha, *Standard-bearer General of the great Dukedom of* Lituania, *Careful as he is for his own safety & preservation after trial made of so many and so various Medicaments, after so many Answers received both in his own Country* Polonia, *& likewise in* Italy, *hath at length arrived now at this time hereat* Witteberg *(no Delphos I confess, but in very truth another* Athens*) that he may now Consult with you, I had almost said, the most wise Oracles of Physick; and expecting from yon the utmost of your assistance, which he earnestly imploreth & expecteth, and you have ever out of humanity afforded it unto any. And (since it is a task imposed upon me) I will very briefly indeed, and yet notwithstanding distinctly, relate the History of this Noble Person; his Affects and as for those few remedies that I shal cal to mind, for the removal and overmastering of this kind of Malady, I shal prescribe them with that modesty that becomes me; and yet nevertheless referring otherwise al unto your most quick apprehension, and accurate Judgment (as unto a Lydian stone) for the further polishing and adorning thereof.*

The principal Affect touching which this Noble Lord is so greatly sollicitous (as of that which hath twice or thrice threatned even Death at the door) is the long lasting and cruel pain of all the lower Belly, having its residence one while in the right, and another while in the left Hypochondrium, *and as soon again about the Navel. This is now the seventh yeer, since that these fierce and cruel pains and torments have had their recourses; which have been so pertinacious and unyielding, that (let me freely speak it) they have now almost driven both the Patient and the Physitian likewise even to desperation; so far have these torturings hitherto been from yielding unto any Medicament. There is now a yeer and a half past since that I was added unto those that had this Noble Person in Cure; in which time only I shal acquaint you what the quality of the Disease hath been, that so there may be no vain repetition of what went before, all things in a manner keeping (as it was related unto me) the very same Course and Tenour at all times. And therefore (that we may speak something of what happened in that space of time) the Case in a manner stood thus. In the month of* July *out of* Italy *we came to* Cracovia, *where this Illustrious Lord had at that very time committed himself unto the care of a certain Physitian that professed the Curing of*

the

Scurvy; who without due respect had unto the Counsel of Hippocrates *(to wit, that before the Dog-star, and during the time thereof, Purges work not kindly, but are rough and harsh) and not at all regarding, that this Noble Lord stood at that time in more need of rest and quietness (by reason of the many discommodities he underwent in his long and tedious Journey) then of any new agitation and disturbance of Medicaments, began to administer unto him those same Scorbutick Medicaments, to wit, the Syrup of Spoonwort or Scurvygraß, the Juyce of the same Herb, and other things of the same rank and order; adding thereto some certain Pouders and Potions that were purging; in which said Medicaments this Physitian persisted for six whole weeks together, without any apparent benefit at all. But at length his most Illustrious Lord seeing that he was not like to get any good from him, began to think of his departure thence; and so about the end of* Auguſt *we came to* Lublin; *whither so soon as ever we were come, those fierce and cruel torturing pains assaulted him all the lower Belly throughout, reaching even unto the Region of the Loyns; which would not admit of any the least intermission, untill after a long time, and many difficulties, and much drawing forth of the peccant humors; as likewise both upwards, by the benefit of a spontaneous Vomit; and downwards also by the frequeut use of Clysters, of a certain snotty Matter, white, insipid, somtimes thin, bitter, yellow, and sometimes duskie; and also withall great store of Wind: In which pain the Belly was so Costive, that the many Clysters that were put up, although otherwise purging, would not be brought back again without much difficulty: the Urine likewise that he made came from him red, and with much straining, and not without an extraordinary pain about the Reins; which afterward (upon the abatement of the pain) flowed forth in greater abundance, and withal he voided much red Gravel. And so (the pain being asswaged) from* Lublin *we came to* Codna, *about the latter end of* October; *this* Codna *is a City of his Lordships. But shortly after our arrival there, the Obstructions return, and the pains are renewed in their former heighth, with frequent swouning and fainting fits (like as but a little before it had befallen him in his Journey) insomuch that we wholly despaired of his life: in which his pains & fainting fits, although that by putting up of mollefying Clysters, and by the use of Evacuating Remedies given him downward, his Belly was much opened and loosned, so that (even as was said before) there were cast forth Excrements of all sorts, with some Evident alleviation and ease; yet notwithstanding the Disease returneth again with no less vehemency then before, other new Obstructions stil succeding the former; neither hitherto could the Disease be extirpated. Yea in the month of* Auguſt *last past, after the taking of a China Decoction, his Disease so far prevailed upon him for about the space of fourty daies, and so miserably was he tortured & wracked by his pains, that we could scarcely move him in his bed, he was almost speechleß, and could very hardly draw his breath. And so in his Journey, in the midst of his Coughing, his breathing was thrice so stopt and hindred, that we were altogether in fear that he would have been strangled. But you must know moreover, that besides those intollerable pains that are felt in all the parts of his Belly; there are others likewise that are sometimes extended throughout the whole Back, and unto the very utmost Joynts; but especially they pass along through unto the joynts of the Arms and Feet: yea in the journey aforesaid, such and so great were the pains that he felt about those parts (after the torturing pains of his lower Belly) that the like thereunto he had never before felt in all his life: for (even as erewhile, you might likewise have observed, most Excellent Doctor) he could scarcely take any rest, nor hardly stir Hand or Foot: unto which pains there at length followed a Palsey (not such as is indeed Usuall, and properly so called) of the Hands and Feet, with a pining away, and illfavoredneß of all the Members, as appeared unto all the beholders. And it is likewise to be observed, that those pains do now recurr more frequently then formerly in the yeers past. There is also adjoyned a Prurigineus or Itching yellowishneß, and Excrescence of the Gumms, with certain red spots, like unto Flea-bitings, appearing more especially in the Back and Thighes, which by degrees tending unto a pale and wan color at length wholly vanish. And although that the pains of the* Abdomen *do now and then intermit; yet nevertheleß his leanneß stil continueth, as also the extraordinary Lassitude of his whol body; the Palsie in like manner stil persisteth, and the pain of the joynts, with such and so great an astriction of the Belly, that he cannot (in truth) of himself void forth any the least shew of excrement: and therefore we are fain often to provoke it, and put it forward with* Aloes Rosat, *and every other day with Clysters. But if the Evacuation be but for one day omitted, then to be sure, his tormenting pains return afresh upon him. And wonderful it is to see, what abundance of Excrements of all sorts (but especially of Choler and snotty Flegm) he daily without fail voideth forth by the benefit of these Medicaments; and yet nevertheleß his Disease stil persisteth with all kind of Obstinacy. Unto those aforesaid purging Medicaments we adjoyn likewise those things that Corroborate; such as, the Rolls of the Species of* Aromaticum Rosatum, Diarrhodon Abbatis; *and adding thereunto Corals and Margarites, the Confection of Hyacinth, Alchermes, and other things of the same rank; and yet by all these means we have hither-*

to done him no good. But as for what concerneth those doubts that by your Letters you signified unto me that I should explain unto you (by loosening the knots of them) thus it is, as far as I conceive. As for that Hæmorrhage which he had some four yeers since, it proceeded not from any debility of the Bowels; for after it he did not again recover his health in that measure that for almost a yeer and half before he had enjoyed it in Italy: neither yet from the retention of the Hæmorrhoids; for together with it the Hæmorrhoids likewise had their Periods every month; which when (from the midst of the yeer only) they altogether intermitted, I was then constrained by Art to provoke them three or four several times. It remaineth therfore that the said Hæmorrhage hath its original from the acrimony & thinness of the blood, which it contracteth from the Head extreamly overheated. And as for the Plica *which he beareth about with him in his Head, it first of all manifested it self almost a yeer after the beginning of those pains; neither is it hereditary; for none of his Stock before him ever had the like Affect. And as for the destillation from his Head, it hath continually been, and as yet abideth in great abundance, even as it appeareth from those things that are continually voided out of the Head, by the Nosethrils and Palate; the greatest part whereof falleth down unto the Stomack, and from thence to the Intestines; from whence perhaps the aforementioned pains receive no small part of their fuel, and that which continually feeds and foments them. The Pulses (that otherwise are alwaies obscure, with some kind of frequency) admit of a variation, according unto the Intenseness or remissness of the pains. The order and Course of his Diet for the most part (especially in the paroxysm of his pains) hath been guided rather at the pleasure of the Assistants, then by the Advice of the Physitian; of Cullises, of Capons mashed together, new Eggs potched and supt up, and Broths aromatized with all kind of Spices. He drinketh Italian Wine, of a good substance. He hath an Appetite so dejected and weak (especially during the continuace of his pains) that even the very smel of Flesh maketh him ready to cast: He is continually thirsty, and thereupon he is very apt evermore to exceed in the drinking of Wine. He passeth whole nights (for the most part) without sleep; and if he chance at all to sleep, that sleep is altogether unquiet, and ful of Phantasms. In* Italy *how and in what manner this Noble Count hath been handled by Medicaments, you have now already seen al that can be written concerning the same. These therfore are those Symptoms that so fiercely and cruelly afflict this most Illustrious Person. From these (as far forth as it is possible) he desireth to be freed. And if ever help and assistance be to be expected for humanities sake; he in very truth (in these his so great miseries and sufferings) desireth and expecteth this assistance from none other, but from your self alone, next under God: I say from thee alone (most Excellent, and Expert* Sennertus) *whom I see to flouriſh (like as a most fragrant Rose in the most delightful Garden of Physick) among the thickest Brambles (as I may so call them) of these difficult Diseases in the aforesaid Province of* Saxony; *and for my own part (I profess) I much admire thy Abilities.* Thus far Dr. *Franciscus Mistruccius.*

And with all these Maladies was this most Illustrious Count continually afflicted. And the truth is, that which exceedingly troubled and tortured him, was the irremovable Obstruction of his Belly, which evermore continued, unless it were removed either by Clysters, or Purging Medicaments. For the moving of his Belly, and the keeping of it open, he had brought along with him out of *Italy* a great quantity of *Aloes Rosat.* But I well knowing that by the use thereof his Belly was dried much the more, diſſwaded him from continuing the Use of it. When he went to stool he then voided Flegm (Viscid, Clammy, and very Tenacious) in great abundance. And withall at that same time he was usually infested by those most grievous and intollerable pains in the Belly, which were most an end terminated in the pains of the Joynts; as for the most part these likewise again ended in those former. But if it so chanced that upon the invasion of these Belly pains he were taken with any great Vomiting (which very often happened) his pains were then the more moderate, and did the sooner remit. There was moreover present a Palsie of all the Members, as likewise of the Tongue oftentimes, so that he faltered therein, and could not speak distinctly. And yet notwithstanding, those most grievous pains of the Joynts (with a certain kind of Swelling) accompanied the Palsey, as we have already said. At certain times also (by intervals) he was infested by a Symptom that greatly terrified him, to wit, a fear of suffocation, and a certain strangling as it were (of which we have already made mention in Chap. 4. touching the Scurvy) which proceeded from a Styptick Vapor contracting the Muscles, moving the Larynx, and as it were violently pulling them together. In the Body (the Back especially) there appeared wan spots; the Teeth were loose, and indeed some of them were already faln out. There was likewise continually to be seen in the hollow of his Hands a perpetuall redness, proceeding (no doubt) from the heat and driness of the Liver; and this arose from the unseasonable use of Medicaments heating and drying. For he had not only for fourty daies together used the Decoction of China (as is beforesaid) but other Medicaments of the like Nature. He lay whole Nights (many times) without any sleep at all. There was likewise present a Fever, that observed

obſerved no courſe at al, ſuch as thoſe are wont to be that accompany the Scurvy. Such was this Patient when I firſt received him, that for the recovery of his perfect health I could give him no aſſurance at al; neither could I wel give him any certain hope of the preſerving his life from a ſudden death, which continually threatened him. But yet nevertheleſs in regard that he had come ſo far a Journey for his healths ſake, I endeavored (what I could) by my continued care and pains to effect his deſire, and to do him good; and by the good hand of the Almighty aſſiſting me I ſo wrought, that his Belly was able again to do its office; and that the excrements acquired again their natural conſiſtence; that the pains of the Belly and Joynts ceaſed; and that the Arms and the Hands had likewiſe their motion reſtored them; inſomuch that the Noble Lord could not only perform other offices with his Arms and Hands, but could likewiſe write Letters. His Belly alſo that was altogether extenuated began again to increaſe, and not only ſo, but even alſo to grow fat again.

And yet notwithſtanding there ſtil remained and pertinaciouſly perſevered the Palſey of the Feet, and their contraction; which could not be taken away by any kind of Medicaments, no not by the uſe of thoſe admirable Baths (to wit, the *Teplicenſes*) into which he was put, in the month of *June*, in the yeer 1629. and as I conceive, it wil hardly ever be wholly and perfectly cured.

Now the Medicaments that I made uſe of were directed unto theſe ends and purpoſes; to wit, that the Belly might again be made looſe and ſoluble; that the Cacochymy might by degrees be evacuated; that the vice of the humors, and the Scorbutick diſpoſition of the Bowels might be amended by Antiſcorbutick Medicaments; and that the moſt urgent Symptoms might be quite removed and taken away.

As for what concerns the matter of Phyſick; here to ſet down al the forms of thoſe Medicaments which almoſt every day were adminiſtred, it would be too tedious, and not worth the while; in regard that the ſame Indications ſtil abiding, the very ſame Medicaments (but yet nevertheleſs with often variation of the forms) are frequently to be repeated in this long laſting and contumacious Diſeaſe. We wil therefore only ſubjoyn the matter of thoſe Medicaments that anſwer unto the Indications, extracted from the forms: which yet nevertheleſs were not al of them adminiſtred in al Medicaments, but according unto the preſent condition, and the Nature of the Circumſtances, ſomtimes theſe, and then another while thoſe were adminiſtred. And yet notwithſtanding we wil here add a form or two. For the looſening of his Belly (which unleſs ſome waies irritated would ſcarcely ever have done its office) he had indeed, as I told you before, brought out of *Italy* great ſtore of Aloes Roſat. But when I perceived that by the uſe thereof his Inteſtines were but the more dried, I diſſwaded him from the uſe of it. And ſo inſtead thereof he often made uſe of Clyſters (unto the which his body had been much accuſtomed) made of the Roots of Marſh-mallows, Polypody of the Oak, the Leaves of Feverfew, of the Herb Mercury, Bears-breech, Mallows, Marſh-mallows, Centaury the leſs; the flowers of Camomile, and Elder; Dill-ſeed, Fenugreek ſeed, Lin-ſeed, Cummin-ſeed; Electuar. Diacatholic. Diacarthum. Benedict. Laxativa, Hiera ſimplex, Syrup of Roſes Solutive; Oyl of Camomile, of Elder, of white Lilies, and Yelks of Eggs.

But the Laxative Syrups were made of the Roots of Polypody of the Oak, Fern, Succory, the Rinds of Tamariſque, the Roots of Capars, Fumitory, Agrimony, Endive, Germander, Spleen-wort or Miltwaſte; the ſeeds of Carthamus, Raiſins; Leaves of Sene, Agarick, Zedoary, Galangal; the Rinds of Citron; the Cordial flowers, Manna, Cream of Tartar, and Sugar; as much of al theſe as ſhal ſuffice.

Pills of the Maſs of Pils of *Fabricius Aquapend.* with the Species of Diacarthum.

For the correcting the vice of the humors, and the amending of the Scorbutick diſpoſition, he made uſe of Antiſcorbutick and opening Medicaments. As for example,

Take *of Scorbutick Water (deſcribed in the third Book of our Practice) four ounces, of Spoonwort or Scurvygraſs, and Borrage, of each one ounce; Conſerve of Spoonwort an ounce and half; of Betony half an ounce: Let them ſtand al night, and ſtrain them in the morning; adding thereto of Tartar and Vitriol, or the ſimple mixture, of each half a dram, and mingle them together.* Alſo,

Take *the Juyce of Spoonwort newly preſſed forth, of Water Pimpernel or Brooklime, and Water-Creſſes, of each a quart; of Succory root newly Candied ſix ounces; Salt of Tartar half a dram. Let them ſtand digeſting in a cloſe Veſſel for ſome daies; and afterwards ſtrain them; unto the ſtraining add, of white Sugar four ounces; Conſerve of Borrage, Betony, and Fumitory, of each two ounces: let them ſtand again in digeſting one whol day and night; and afterward ſtrain them.* Alſo,

Take *of the ſimple Mixture one ounce and half; Rob of Juniper one ounce; Juyce of Spoonwort, Water-Creſſes, Brooklime, of each ſix ounces; Species of Diarrhod. Abbat. two drams; Syrup of Borrage, of the leſſer Gilliflower, of Acetoſit. Citri, of each one ounce and half; Cinnamom Water half an ounce; let them ſtand digeſting, and afterward pour out al thereof that is cleer.* Alſo,

Take *of the ſimple Mixture one ounce and half; Rob. Juniper two ounces; Extract. Calam. Aromat.*

Aromat. one scruple; Saffron half a scruple; Conserve of Spoonwort three ounces; Fumitery, and Sorrel, of each one ounce and half; Juyce of the Citron new drawn four ounces; Scorbutick Water six ounces; Spoonwort Water four ounces; Cinnamom Water half an ounce: Let them stand in digestion; and afterward strain them.

He made use likewise of the Pils of the Trochisques of Capars; the Extract of Succory, Spleenwort, and Gentian; and also, Cream of Tartar Vitriolat.

There were likewise Rols prescribed for him, of the Species of Aromat. Rosat. Abbat. Diarrhodon Abbat. Plires Archont. Extract of Orrace, Elecampane, Eryngus, the Pouder of Bezoar: as likewise this Pouder:

Take Species Diaireos one dram; Calam. Aromat. the seed of Cresses, Rocket, Saffron, of each one scruple, Cinnamom one dram; Cream of Tartar two drams; make a Pouder.

He used Electuaries made of the Conserve of Spoonwort, Betony, Sage, Succory, Germander, Ground-pine, Citron Rinds Candied, the Root of Vipers Grass Candied, Rob. Juniperi, Confect. Alcherm. Syrup of Borrage, Gilliflower, Acetos. Citri.

He made use also of the Wine of Spoonwort; which is made, if some handfuls of Spoonwort (while it is yet green) be bruised very smal, and a few pints of Rhenish Wine poured thereto; and then let them stand in a Cellar in a Glass Vessel, for three daies; and then afterward strain them. And this also,

Take Wormwood three pugils, Conserve of Spoonwort three ounces, Green Water-Cresses bruised one handful; the dry Rinds of Citron six drams; pour thereunto of Rhenish Wine two quarts: Let them stand in a Glass for some daies; and after this pour out that which is cleer.

And at length when I had once gotten the Spirit of Spoonwort from that most industrious Apothecary of *Gorlicum, Johan. Buttnerus*, which (like as he doth also out of most other Plants) he artificially prepareth by fermentation and distillation, that so it may still retain both the smel and the taste of the Plant; when our Patient was tired out with, and even loathed the taking down of any other Medicaments, he then most frequently, and with very much benefit, made use of this Spirit.

And likewise that we might provide for the safety of the Spleen (which at this time was very far amiss) we caused an Emplaster to be put upon the Spleen.

The pains of the Belly and the Joynts took place (as it were) by turns, and reciprocally; so that when the pains of the belly remitted, then the pains of the Joynts began; and so on the contrary, when the pain of the Joynts ceased, then those of the Belly began to disquiet the Patient: and both of them were (for the most part) much moderated, when he plentifully (which very often so happened) cast forth the tart, salt, and bitter humor, in an almost incredible abundance.

For the mitigation of the pains of his Belly, there were prescribed Clysters, of Marsh-mallows, Camomile, Fenugreek seed, Dil seed, Linseed, Oyl of sweet Almonds, Oyl of Dil, Oyl of Camomile, Honey of Roses, Oyl of Bayberries: and unto the Belly there were laid both Fomentations and Cataplasms of the same and the like Medicaments; and the Emplaster of Lawrel Berries. He used likewise the Decoction of the flowers of Camomile with Manna, and the Oyl of sweet Almonds.

For the pains of the Joynts in the Hands and Feet there were used Fomentations and Cataplasms, of the Roots of Marsh-mallows, the flowers of Camomile, and St. Johns wort, Wormwood, Betony, Water-Cresses, flour of Lin-seed, and Fenugreek seed, Earthworms, Oyl of Elder, Oyl of Camomile, and the Unguent Dialthæa.

The Wife of this Noble Lord told us that in her Country (for the moderating of such like pains as these) they had in use Cataplasms made of the Horse Raddish, bruised and boyled; and (this being grounded upon Reason) there were therefore such like Cataplasms imposed now and then, with very good success.

There were likewise used Fomentations of Elecampane Roots, Marsh-mallow Roots, Bryony Roots, Lawrel Leaves, Sage Leaves, Rosemary Leaves, Herb Ivy Leaves, Wal-flowers, Lavender flowers, Prim-roses, Arabian Stœchados, and Juniper Berries. As also Inunctions of Marsh-mallow-Roots, and Bryony Roots, and Earthworms boyled unto a softness; adding thereto the Juyce of Spoonwort and Water-Cresses, Unguent of Bdellium, and of Turpentine, Oyl of white Lilies, Oyl of Camomile, as also of the Unguent Valeriola; which we may find in the fourth Book of his Observations. And so likewise this:

Take the juyce of Brooklime, Water-Cresses, of each one ounce and half; Oyl of white Lilies two ounces: boyl them til the Juyces be consumed, and then add Oyl of Turpentine half an ounce; Oyl destilled out of Juniper Berries, and the Unguent of Bdellium, of each one ounce; Gum Elemi, and Gum Hederæ, of each three drams; Mans Fat half an ounce: Mingle them.

Also the Unguent that is made of the Root of the Florentine Orrace, the Leaves of Sage, Primrose, Tansey, Mugwort, Betony, Bayberries, Juniper Berries, Rocket seed, Lavender flowers, and Spike flowers, boyled in Wine, and the Oyl of Earthworms, the Oyl of Foxes, the Oyl of Rue, the juyce of Water-Cresses; and then strained, adding thereto the destilled Oyl of Juniper, Sagapenum, Bdellium, Styrax Calamit. Gum Elemi,

mi, the Fat of a Fox, and Mans Fat, and Wax.

My own Emplaster likewise for the Nerves was added, of which this is the Description:

Take Leaves of Lawrel, Betony, Rosemary, Ground-pine or Herb Ivy, and Prim-rose, of each one handful; flowers of Lavender half a handful; the tops of St. Johns wort one handful; Earth-worms washed in Wine three ounces; boyl them in good Wine; and being strained add thereto Oyl of Camomile three ounces; Oyl of Orrace an ounce and half; boyl them until the Wine be consumed; and then add of cleer Turpentine three ounces, Goats Suet an ounce and half; Gum Elemi two ounces, Tacamahaca dissolved, Shippitch, Rosin, of each one ounce; boyl them again; and then add, Litharge three ounces, Wax as much as wil serve the turn, and make an Emplaster; unto which in the end add Oyl of Turpentine, and of Juniper Berries, of each an ounce and half; of Rosemary, and Sage destilled, of each one dram; and mingle them.

For the Palsie of the Tongue there were made use of Mouth-Washings of Sage Water, Rosemary Water, Extract of Calamus Aromaticus, Oxymel Scillitick, the destilled Oyl of Nutmeg; and likewise Inunctions of the Tongue, of Treacle, Extract of Castoreum, of Calamus Aromaticus, Oyl of Nutmeg, of Sage, and Mustard seed. There were also Trochisques made of the same.

For the Vices of the Gums, and the loosness of the Teeth, there were prescribed Unguents of the Leaves of Columbines, of Sage, Mints, Nutmeg, flowers of red Roses, Allum, Honey; Collutions or washings for his mouth there were made of the Decoction of Fern Root, and Bistort or Snake-weed, the Leaves of Water-Cresses while they are yet green, Sage Leaves, Mints, Columbines, Frankincense, the Water of Sage, and Mints, Alum, and Honey Rosat.

And by these Medicaments indeed, although (as we told you before) that the Disease of the Scurvy was for the greatest part removed and cured, (excepting that the Palsey of the Feet remained stil firmly fixt and immovable;) yet notwithstanding the *Plica* held on its old course stil; only there was one Nail on one of his Toes that returned unto somwhat a better state and condition.

Chap. 10. *Of the Vices of the Nails.*

First of al, if the Nails have their own Natural Constitution, like as other parts of the body, they are then smooth and plain, and they have a color white and red, and a due and meet hardness and thickness: if this their Natural Constitution be changed, it fals then under the Nature of a Disease.

Nails unequal, thick, and rugged.

And first of al, indeed the Nails are somtimes unequal, and become thick and rugged. Which happeneth from the juyce by which the Nails are nourished, abundantly flowing thereunto. For then they are not only made long, but they likewise become thick, unequal, and rugged. And this happeneth from strong and hard labor, by which the Nails about the roots of them are as it were moved together, and so they attract the aliment in greater abundance.

This Vice cannot easily be amended, unless that the external Cause cease. But if the said external Cause be removed, then in process of time (those thick and unequal Nails being by degrees cut off) other that are better wil succeed in the stead of them.

The Roughness of the Nails.

Scabrities and Lepra of the Nails.

Moreover, the Nails also become rough, and ill colored, and thick; which Vice is called the *Scabrities* and *Lepra* of the Nails: in which Vice, not only the magnitude, but likewise the figure and Conformation of them is vitiated.

This Vice is generated from the vitious and excrementitious humors mingling themselves with the aliment of the Nails. Now those humors are more especially Melancholick, which is shewn even from the color it self of the Nails, they having in them something of Tartar, from whence the said hardness proceedeth.

This Vice is manifest unto the Eyes, and bringeth along with it rather a deformity, than any danger; and yet nevertheless it may hurt and hinder the laying hold upon any thing, which is wont to be done by the Nails; and it likewise sheweth withal, that there is some vitious humor lying hid and concealed in the body, that Nature thrusteth forth unto the Nails; like as we have before told you, that those who are affected with *Plica Polonica* have also this evil befalling them.

This Vice is cured, if what cannot be amended be by degrees pared away, and the excrementitious humor discussed. If the Vice be but new begun, then the Decoction of the Vetch Orobus and Lentiles wil be very convenient; or else a Cataplasm formed of their meal: or else let Sulphur with Oyl and Vinegar be laid upon them. *Pliny* writeth that Orach (or Arrach) wil take away the Nails without any Ulcer; as we find it in his 20. Book, and Chap. 20. And the lesser Celandine with Pitch doth perform the very same. Or else let an Unguent be imposed, or an Emplaster made of Pitch, Wax, Rosin, Mastick, Burgony Pitch; or else lay on Raisins with Opopanax, or Cresses with Lin-seed: stronger are the Roots and Leaves of Crowfoot. Or,

Take *Rosin half an ounce; Turpentine two drams; new Wax, and Goats Suet, of each five drams;*

drams; Mastick one dram and half; Frankincense two drams; Make an Emplaster.

See more of these in *Paulus Ægineta* his second Book, and 81. Chapter. And in *Avicen*, in the seventh part of his fourth Book, last Tract, and 14. Chapt.

The color of the Nails changed.

But sometimes only the color of the Nails is vitiated; so that they become leaden colored, yellow, and black. Which Vice happeneth not only by reason of the change of the color of the flesh lying underneath (as some have thought) but because the very aliment of the Nails is vitious, and endued with such a color. And now and then likewise the Nails are here and there marked with certain smal white spots (especially in the younger sort of people) which arising for the most part about the Roots of them, together with the growing Nail they change their place; until at the length they are pared off with the Nail; and they have their original from the thick juyce that mingleth it self with the aliment.

In Currriers also (by reason of their handling of Lime and Ley) and in Dyers (by means of their handling their Dying stuff) the Natural color of the Nails is frequently changed into another, which oftentimes lasteth and continueth long.

This Vice indeed bringeth with it no danger at al; but yet it causeth a deformity, and is very offensive and troublesom unto Men, but especially unto Women.

But now that this Vice may be taken away, the vitious humors (if they lie hid in the whol body) are to be evacuated; and then after they are to be taken away out of the Nails themselves. This may be done, if the new growing nails be very often pared, until al that is vitiated be quite taken away. And unto the Nail it self that Emplaster that ere while we mentioned (in the *Lepra* of the *Nails*) is to be applied.

But there is then a peculiar change of the color of the Nails, when by reason of a Contusion there is blood shed forth under the Nail; and when shining through the Nail it produceth a red or a blackish color, as it is wont to happen in Suffusions. Which if it chance, *Avicen* adviseth to make a hole through the same, and so to let out the blood that lieth underneath the Nail. And yet nevertheless, there is in thus doing great care to be had, lest that in the perforation the nervous skin lying underneath be hurt, and so a pain be thereby excited. The Nail having a hole made through it (or if it hath not, it maketh no matter) lay upon it Candy Dittany, with the Glue or Gelly of fish. Or the Basilick Emplaster, or the Root of Solomons Seal wel bruised. Or,

Take *Sagapenum as much as you please; mingle it in a Mortar with the Oyl of Nuts, that an Emplaster may be made and laid thereon.*

The Crooking of the Nails.

There are some likewise that make mention of the crooking of the Nails among the Vices of the Nails; and indeed it is of that crooking wherein the Nails (in their extremities) are rendered crooked, and as it were hooked (like as we see is to be in Birds) and this crooking they say proceedeth from a driness that doth overmuch contract the substance of the Nails. But this Affect is very rare; neither (when any such there is) doth it proceed from driness, but from a vitious matter; by reason of the abundant flowing of which the Nails come to grow in that vitious and uncouth manner: and this (as we have already told you) happeneth in the *Plica Polonica*. And therefore there is no other way or method of Curing of this Evil, than that of Rough and Leprous Nails.

This is not unusual (especially in the Feet) that the Nails grow forth too much at the sides, and make a hole through the skin lying underneath; upon which the flesh there in that place beginneth to grow luxuriant, and to become proud, and proveth a very great impediment, both in putting on of the shoos, and also in going. Which if it happen, we are then to sprinkle upon the place burnt Alum, which taketh away whatsoever of the flesh is superfluous; and afterwards the Nail that hath grown forth too long is to be pared off.

The Cleaving of the Nails.

And now and then likewise solution of Unity happeneth unto the Nails; so that they are cleft either longwaies, or else transversly, and as it were cut into two thin plates.

And this cometh to pass either from Causes external, as Wounds; or else from the viciousness of the Humor, which sometimes falleth out in the French Disease, and the Leprosie.

If the Cleft be from a Wound, the Wound is then to be healed: yet nevertheless the cloven Nails can no way be united; but while they grow a whol and sound Nail is wont to succeed the cloven: but care must here be taken lest that the Nail in that part where it is cloven should grow together with the skin lying under it. For if this should happen, the Nail wil never be whol as it ought to be; but wil evermore grow forth cloven and in two parts.

If this Fissure or Cleaving arise from any other Disease, and vitious humors, then that Disease is to be cured, and such like Topicks are to be administred unto the Nail as are wont to be applied in the roughness of them.

The

The Falling of the Nayls.

And at length also the Nails are wont to fal off, leaving the extream part of the Finger quite naked: which Vice may not unfitly be referred unto Diseases in the number; since that without cause the Nails are excluded from the Number of the parts, notwithstanding that they have their Natural conformity and use, and are nourished like as other parts are, and cohere (as al other parts likewise do) unto the whole. But why the Nails fal away, this first of all and principally proceedeth from the fault of the Aliment; which when it declineth into another Nature, and so indeed that the Aliment is not only become simply vitious (the same that happeneth likewise in the ruggedness and roughness of the Nails) but that it is also sharp withal, and corrodeth the roots of the Nails (in the very same manner as the roots of the hairs are wont to be gnawn asunder in the *Alopecia*, *Ophiasis*, and shedding of the hair) the Nails then fall off. And so very often after Ulcers and Wounds about the roots of the Nails, the Nails are wont to fal off, *Pus* or filthy matter gnawing asunder the roots of them. And when the roots of the Nails are eaten asunder by the said purulent matter, although the Nails do not then fal off of their own accord, yet by the Nail new growing they are thrust off. And so it is found that after pestilent and Malignant Fevers, not only the hairs have shed, but the Nails likewise have fallen off: and this hath likewise been observed to happen after the drinking of Poyson, and in the French Disease. And moreover, the very same may likewise happen from the want of Aliment; like as we have seen and found by experience, that such as have travelled in the Snow, and that have held their hands long in cold water, have had their Nails fal off, either from a Constipation of the Pores of the hands that carry the Aliment unto the Nails, or else from the extinguishing of their Native heat.

Now this Vice (which is obvious unto the sight) doth not only cause a deformity, but likewise hurteth the laying hold on any thing, for which the Nails serve: and moreover (in regard that the Nails do as it were defend the Fingers ends against external injuries) by this means the Fingers are rendered as it were defenceless, and easily obnoxious unto al kind of external injuries. And therefore this Malady doth deservedly require a Cure. And yet nevertheless all the Nails that fal off cannot be restored. For if from a depraved humor the whole root of the Nail be eaten asunder, and the Malady hath now long continued; or if by reason of the want of Aliment the Nails be fallen off, they can very hardly be restored. But if the root be not wholly eaten asunder, and the Malady be but new begun, there then remaineth some hope of a Cure: and therefore in this case we are to cover the Nails with a Cap made of Ladanum, Ammoniacum, Bdellium, and Wax.

The looseness of the Skin about the roots of the Nails.

Reduvia, or the looseness of the skin about the roots of the Nails.

And then at length, there is likewise a Vice, not of the Nails themselves, but of the Skin that is next unto the Nails; which the Latines call *Reduvia*, and the Greeks *Paronychia* because that it is neer unto the Nails. But this *Paronychia* of the Greeks is a Vice far different from the Disease that is described before (in the first Part of this fifth Book, and Chap. 14.) and is there reckoned up among the Inflammations, and by the Arabians is also called *Paronychia*. For that *Paronychia* (as we there told you) is a most grievous and dangerous Disease. But the *Paronychia* of the Greeks (of which we are now speaking) or *Reduvia* as the Latines call it, is the least and lightest of all Affects, and bringeth along with it no danger at al; and scarcely deserveth the Care and pains of a Physician; as appeareth out of *Galen*, who in his Comment. 2. touching the Nature of Man, about the end thereof, disputing whether or no that Book were written by *Hippocrates*, saith that *Sabinus* and the rest that reject that Book, do indeed take notice of a few smal faults that are therein, but they neglect and pass over without any notice taken of the faults that are far greater, and worth Consideration, after the fashion of those ill Physitians, who while they consider and take notice of the *Paronychia* of sick Persons, they then through Ignorance neglect the greater and more difficult Evils

Neither indeed is there any reason for us to think, that the *Paronychia* of the Greeks and that of the Arabians is one and the same Affect, and that *Reduvia* is a small and beginning *Paronychia* (such as the Greeks describe) either in the Swelling, or Inflammation, or any notable pain; which is in a Species of the *Rhagades*, and is described by the Greeks. But if it be already become such, it will then turn into an Inflammation, and a dangerous Impostumation, such as is described by the Arabians, and is by them named *Panaritium*. For these things do no way answer to Experience. For neither doth the *Panaritium* of the Arabians begin from such like Clefts, neither is the *Reduvia* and *Paronychia* of the Greeks ever turned into the *Panaritium*.

Reduvia what it is

Paronychia therefore, or *Reduvia*, is a certain sleight Cleft of the Skarf-skin at the Roots of the Nails.

It proceedeth from a salt humor eating through the Skin in that place.

The Vice appeareth sufficiently of it self; neither hath it any danger at all to attend it, but only that it is somewhat troublesom by reason of some light and smal pain that followeth it, whenas the Skarf-skin being cleft and divided the true Skin is left quite naked.

Now it is Cured by Purslane, the Roots and Seed of Mallows, Oyl of Violets, and Oyl of Roses.

Clefts in the Hands.

In the last place we think it not amiss, to mention also the Clefts that are oftentimes found in the Hands; which happeneth more especially about the beginning of Winter, when the Hands being tender are exposed unto the Cold, whereunto they have not as yet been accustomed; whereupon it is that they contract these Clefts, especially about the Joynts; yet nevertheless, this same happeneth somtimes likewise unto the Feet.

It may be Cured most speedily, and most conveniently by this Unguent.

Take *Litharge of Silver, Myrrh, and Ginger, of each alike parts; bruise and pouder them very small; and so with Virgins Wax, Honey, and common Oyl as much as wil suffice, make an Unguent; unto which (for the rendering it the more grateful to the smel) Musk and Ambar may be added.*

THE

THE FIFTH BOOK. THE FOURTH PART. *Of WOUNDS.*

Chap. 1. *Of the Nature, Causes, and Differences of a Wound.*

AMong the external preternatural Affects of the Body, and such as are obvious unto the senses, there remain Wounds, Fractures, and disjoyntings; of which we will now speak in order. And First of all, as touching a Wound, that it is a solution of Unity in a part, Bone, and softer *Cartilage*, is without al doubt and controversie. But yet nevertheless it is somtimes taken largely, and somtimes in a more strict sence. *Celsus* taketh it in the largest sence of all, when (in his *fifth B.* and *sixth Chap.*) he thus writeth: *That Wound* (saith he) *is far worse, and more dangerous, which is caused only by a Bruise, then that which is made by incision and dividing the part; so that it is also far better to be wounded by a sharp and keen edged Weapon, then by that that is blunt.* It is taken in a large acceptation, when it is attributed unto all kind of solution of Unity made by any sharp instrument; whether this solution be made by pricking, or by cutting; like as *Galen* (in his *Sixth B.* of the *Meth.* of *Physick*, the *first* and *following Chap.*) calleth the pricking of the Nerves the wounding of them. It is taken strictly, when it is distinguished from a pricking; that a wound is the solution of Unity in a soft part, made by a Cut from any keen and cutting instrument; but a pricking is that solution of unity that is caused in a soft part, by a prick from an instrument that is cutting. By which it appeareth, that the solution of Continuity in a soft part is wider and broader then a Wound, whether it be made by cutting, or by pricking. For Unity may also be dissolved (in a soft part) by a thing that is not sharp, but only hard and heavy; and this may be, the Skin either appearing whole, or even broken likewise, which happeneth in those Wounds that are inflicted by Bullets from Guns. Moreover also the Unity of the soft part may be dissolved by extension, which (in special) in the similary parts is called Rupture, but in the Compound, *Apospasma*; to wit, when those fibrous Ligaments and Threads (by which the parts are fastned together, the one to the other,) being broken, the parts themselves likewise become broken. By all which it appeareth, that a Wound is the solution of Unity in a soft part, caused by a cutting and sharp instrument.

A wound what it is.

But if (as *Guido* in the *Second B.* of his *Chirurgery*; and *Fernelius* in the *seventh B.* of his *Meth. of Physick*, *Chap sixth*, rightly admonish us) the Wound become sordid and foul, and that some thing be by the *Pus* or filthy corroding matter eaten away from the substance of the wounded part, then the Wound passeth into an Ulcer; or certainly we may very well say that an Ulcer is conjoyned with the said Wound. The truth indeed is, that *Rudius* (in his *B.* of *Wounds*, and *first Chap.*) doth impugn this Opinion; but al to little purpose. For neither is it absurd (as he without Reason thinketh) that one Disease should be changed into another, or that one should be added and joyned to another.

The Wound and Ulcer they are both of them the solution of Unity in the soft part; but the Wound is made by section or cutting alone, whereas the Ulcer is caused within it by Erosion; and therefore it is that in an Ulcer there is somwhat that is lost from the substance of the part. If therefore in a Wound of any part somthing shall be Eaten away and consumed from the substance of the flesh, it is then altogether to be granted, that now there is likewise present even an Ulcer also. Which nevertheless is not so to be taken, as though so soon as ever on the fourth day the *Pus* or filthy corrupt matter doth begin to appear in the Wound, that then likewise an Ulcer may be said to be present. For that said *Pus* proceedeth from the blood that is shed forth without the Veins; or some Aliment that sticketh in the Capillary Veins, and spaces of the parts; neither is there then any thing Eaten away from the substance of the part. But if there be so great an abundance of the *Pus* gathered together (whatsoever the Cause thereof be) that somthing be Eaten away from the substance of the part; then it cannot be denied but that there is an Ulcer likewise present; seeing that there are then present all things that are required unto the Essence of an Ulcer; and in this Case, the Cure is no longer to be ordered as in a single and simple Wound, but as in an Ulcer.

But since that a Wound is to be accounted in the number of Diseases, there may be enquiry made (and that upon good grounds) what actions they are that are hurt thereby. Unto which it may be rightly answered, that all the Actions of the said part, and the severall uses thereof unto which the part is destined, are hurt by the Wound, whether that part perform those actions, either as a similary, or as an instumental part. That the Organical Actions may oftentimes be hurt by a Wound, (to wit, when the part destined for motion is Wounded) cannot be denied, it being a thing so manifest; since that the wounded Member can no longer be moved in a due and right manner. As likewise the Vein that is cut assunder can no longer convey the blood unto the part, for the nourishment thereof; neither a dissected Artery the vital blood and spirits, or a Nerve the Animal Spirits.

But indeed the truth is that the temperament of the part is not next of all and immediatly hurt by the Wound; but yet nevertheless it is mediatly hurt; to wit, when the Vessels being cut assunder, and the blood poured forth, the heat of the part is withal dissipated, and the influx of the Blood, spirits, and heat flowing in (this last being so necessary and requisite unto the temperament of the part) is altogether hindred. For all which Causes, the attraction of the part, the Concoction, the Nutrition, and the expulsion, is hurt. And from hence it happeneth, that the temperament being changed, there are more Excrements generated in that part, then otherwise were wont to be. And from thence also it proceedeth, that the *Pus* is not presently generated in the very beginning of the Wound, but afterward, to wit, about the fourth day, when the heat of the part that was dissipated is again restored.

The Use is likewise hurt in the Wounded parts. The Skin being Wounded can no longer cover the parts lying underneath it; neither the dissected *Peritonæum* the Intestines; the Cornea Tunicle of the Eye can no longer contain the Humors; neither can the Arteries when they are once cut in sunder any longer contain, or convey the Blood; neither can the Nerves carry the Animal Spirits.

The Differences.

The Differences of Wounds, some of them are Essential, and others of them Accidental. The Essential are taken from the very Nature of the Wound, to wit, from the form thereof; in which respect, according to the Figure, some of them are straight, other of them oblique, and these indeed likewise of a very various Figure: in respect of their Magnitude, some of them are smal, and others great; some deep, others of them only superficial; and hither also may this be referr'd, that a wound being inflicted, either there is somwhat cut off from the substance of the part, or else there is not any thing at all cut away. Although (if we would but rightly and accurately Judg of the thing) these are no proper and Essential Differences, in regard that they are taken not from the very Essence of the Wound, but rather from some certain Accidents that happen thereto, to wit, the greatness, the figure, &c. From the part affected, (which is somtimes the Musculous Flesh, somtimes a Nerve, now and then a Ligament, and very often a Tendon) now this, or that part is affected. And indeed in one and the same part, there is great respect to be had, in what particle of the part the wound is; as for example, whether the Wound be in the beginning, or in the end, or else in the middle of the Muscle: and whether or no in the Wound of any Bowel, the *Parenchyma*, or the Vessels therein be wounded. From the Cause, because that the wound inflicted is either by cutting (which is in special called a wound:) or by pricking, which in special is called a puncture or pricking: or else together with the pricking there is likewise present an incision; or else there are present together an incision and contusion; or else all these three, incision, pricking, and Contusion, are Joyned together.

But the Accidental Differences are such as are drawn from those things that are without the Definition of the Wound. *Galen* (in the *Third B.* of his *Meth.* of *Physick*, and *last Chap.*) hath reduced them to three Chapters; and he teacheth us that they are taken either from the manner of their Generation; (to wit, that there is a total incision, or a total disruption;) or else, that there is only a part cut, or a part broken. Secondly, From the situation of the Wound, to wit, when in a wound obliquely inflicted, one part of the Wound is in sight, and another part lieth hid under the Skin. And Thirdly, From the time, that one wound is fresh, and new made, another old and inveterate.

There are likewise certain other Accidental Differences (we may rather call them improper) taken from those things that are conjoyned with the Wound; to wit, that that wound is poysonous that is inflicted by a poysoned sword; or else by the biting of some venemous beast: that there hath chanced unto the wound some inflammation, or an *Erysipelas*; or that there is a Fracture, or disjoynting Joyned therewithall: or else that there is conjoyned an Hemorrhage, Pain, or some other Symptom.

The

The Causes.

We need not say much touching the Causes of Wounds. The Causes of a Wound that is made by cutting, are al those things that have in them a power of Cutting, Swords, Glass, and the like. Of a Puncture (or pricking) the Causes are, whatsoever things are sharp-pointed, as Arrows, Needles, and the teeth of living Creatures. Of Ruptures, such things as distend the soft parts, and pul them into Contrary parts; such as the lifting or carrying of some extraordinary weight, a Fall, Blow, lowd speaking, and the like. Those things that bruise, are all things Heavy, Hard, and Blunt, as Stones, Wood, Lead, and among these Leaden Bullets shot out of Guns have in them a power of perforating.

Chap. 2. *Of the Diagnostick Signs.*

THe Truth is, that the wound it self is (of it self) sufficiently manifest unto the senses; and therefore needeth not any signs whereby it may be known. But although that place in the Skin that is wounded be obvious and open to the sense; yet nevertheless if the Wound penetrate unto the more inward parts, what parts they are, that are wounded within is oftentimes very obscure, and hidden from us. But this may be known, first from the situation of the parts; Secondly from the Action that is hurt, and the Use. Thirdly, From the supervening Symptoms; and Fourthly, from the Excrements. For if the wound of the Head be so inflicted that it be very deep, it sheweth that the Brain is wounded: and if the whole Thorax or Chest be run through with a Sword, it argueth that the Lungs are likewise wounded; and so of all the other parts. For the exact and perfect knowledg of which, the Scituation of the parts is to be learnt from Anatomy. Secondly, the Actions that are hurt do demonstrate the Wounded part. And so, after a Wound received in the Privy parts, if the Urine flow forth of its own accord, it sheweth that the Sphincter of the Bladder is hurt. But here notwithstanding, we are wisely and carefully to consider, (in case any Action be hurt) whether the hurt of the said Action be not by Consent of some other part. And therefore other Signs are to be conjoyned. If (a wound being received in the Abdomen) the Intestines fall forth, it is an Argument that the Peritonæum is cut asunder.

As for what concerneth the Excrements; If Chyle flow forth upon the receiving of a Wound, it is a sign that the Stomach is wounded, or the smal Bowels; if the Excrements of the Belly, that the greater and thicker Intestines are wounded; if Urine flow forth of the Wound, then it sheweth that the bladder is wounded; if out of the Wound of the *Thorax* (or Chest) Air pass forth, it is a sign that the Lungs are wounded. Whether it be a Vein or an Artery that is hurt and wounded, the efflux of the Blood will shew; since that, what floweth forth from an Artery cometh forth Leaping and Dancing, as it were, and is more Red then that from the Veins.

We have notice likewise given us of the part that is wounded from the supervening Accidents. And so a vehement pain suddenly happening manifesteth that some Nerve is wounded.

Chap. 3. *Of the Prognosticks, and foretelling of the Event of Wounds.*

BEfore the Physitian attempt the Cure of a Wound, he ought First to be very Sollicitous and Inquisitive touching the Prognosticks. To wit, in the first place, he ought to foreknow, wheth r the Wound be Curable, or altogether incurable. And then if it be indeed curable, whether the Cure will be easie, or difficult; and whether or no the wounded person be like to have his former perfect soundness restored unto him; or else whether or no being Cured, and his Wound healed, he be likely to undergoe and suffer the hurt Action of some one or other of his Members. For so oftentimes it happeneth, that some Tendon being cut asunder, the motion of some part is wholly lost; and that the Brain being wounded, the Memory, or Rational faculty is thereby hurt: and Moreover, whether the wound be likely to be Cured in a short, or whether it wil take up a longer time. But on the other side, if the wound be altogether incurable; whether it be Mortal, and such as is likely to hasten Death; or else whether it be not more probable that it will degenerate into some long continuing Ulcer.

And Lastly, it must be foretold likewise, whether the Changes and Alterations of the Wound will be for the better, or for the worse, and when these Changes wil be. Now in the first place, it must be diligently explained,

What Wounds are Deadly, and what Wounds are not so.

For indeed this Question is of very great Moment, and therefore most diligently and exactly to be weighed and known by the Physitian. For whereas oftentimes the lives

of some men are much hazarded and endangered, (when they are brought before the Magistrates in the publike Courts of Justice) by Reason of Wounds they gave unto others; and that oftentimes the Judges desire the Physitians Opinion touching the same; great Care and a diligent Endeavour ought to be used, that the Physitian give so true a Relation, and so distinctly deliver his Opinion touching the quality of the said Wounds, that the innocent may not be condemned, nor the Guilty acquited.

But in the first place we are to know that not every Wound which hath Death following it is to be called a Mortal wound, but that alone which in its own Nature bringeth Death. Now such like wounds are twofold. For Mortal or Deadly (as *Galen* in the 5. *B.* of the *Aphor. Aphor.* 2. and *Aph.* 18. teacheth us) is somtimes taken and understood of those wounds that are of necessity deadly and somtimes again of such Wounds as are so for the most part, as *Hippocrates* speaketh; and such as by Reason of which (as the same *Hippocrat.* maketh the limitation in the 18. *Aphorism, 6. Sect.* in *Coacis*, or his tract of Playsters) those that are wounded, almost, or for the most part die: like as *Galen* (in his 5. *B. Aphor.* 2.) writeth, that Deadly is to be taken for that that is dangerous, and is oftentimes terminated in Death. But the Question is here especially of the former kind; for that wound that hath been at any time Cured in others cannot be taken for a wound simply Mortal and Deadly. But we shall afterward tel you, when it is to be taken and accounted for Mortal, or not Mortal. And therefore, Secondly, Wounds cannot be accounted simply Mortal, whereupon the supervening of most grievous Symptoms (which said Symptoms notwithstanding do not alwaies and necessarily follow upon the reception of these like wounds) the wounded person dieth; as when in the Wounds of the Joynts, and the Nervous parts, an inflammation, Deliry, and other Symptoms happen; or that by Reason of a Cacochymy lying secretly in the Body a feaver is kindled upon occasion of the Wound. And it is altogether most true, that many things often fal out that render Wounds incurable, which in their own nature were curable. Like as neither are those to be accounted for Wounds simply Mortal, the Curing of which is long protracted, & by Reason of which it at length happeneth that the Wounded person perisheth by a slow and lingring Death: the same that happeneth when (the Lungs being Wounded) an Ulcer and the Consumption follow thereupon; or the Thorax, or Stomack being wounded; which oftentimes after a long space of time become the Causes of Death unto the wounded person. For whenas it hath been observed and known that these like Wounds have been healed in others, they cannot then be accounted for Wounds simply Mortal. But those Wounds are only to be reputed simply Mortal, which in the space of a few hours, or daies, do necessarily bring Death unto the sick person, and cannot be cured by any Art. And therefore we are to distinguish between Wounds Mortal, and Wounds incurable. For all Mortal Wounds are incurable, but all Wounds that are incurable cannot be said to be Mortal. For Wounds incurable (as we have told you) are al those that though they cannot indeed be cured, yet notwithstanding they are not suddenly the Cause of Death unto the wounded person, since that (although they cannot be healed) yet nevertheless the sick person may after this live not only many Weeks but even yeers also. And such a like Wound was that which *Matthias Cornax* (in his *Epistle Responsory unto* Dr *Ægidius Hertogh.*) and *Julius Alexandrinus* (in his *Annotations upon the sixth Book of* Galen *his Meth. of Physick, Chap.* 4.) have described unto us. For whenas a certain Bohemian Boor (as he was hunting) received a Wound in his Stomack with a broad hunting speat, it could not possibly be consolidated but yet in tract of time the lips of the wound became hardn'd by a certain Callousness growing over them, so that the wounded person survived for many yeers after; and by applying of an instrument he could at his pleasure evacuate his stomack.

And now in the next place let us see what Wounds they are that we may account to be simply Mortal, or Deadly. And now whereas Death happeneth upon the defect & extinction of the Native heat; and that the Native heat may in a twofold manner be extinguished, either sensibly and by degrees, (as it is in a Natural Death, and long continued Diseases, as the Consumption, and the like,) or else suddenly and violently: the latter way it is that Wounds are said simply and necessarily to bring Death unto the wounded person, to wit, a violent one.

Now the innate heat is extinguished, either because the vital spirits are dissipated, or because they are suffocated. And therefore all Wounds that are Mortal, and of necessity cause a sudden and violent Death, either they suddenly suffocate the vital spirits, or else they dissipate and corrupt them. But in regard that the Heart is the Store-house of the vital spirits and the Native heat, first of all therefore the Wounds of the Heart of all others do especially and most speedily bring upon the Wounded Person a violent Death.

And

And the very truth is (as *Galen* writeth in his 5. *B. of the places affected*, and 3. *Chapter*) if the Wound penetrateth unto the ventricle of the Heart, (especially the left) the wounded person of necessity dieth suddenly: but if the Wound penetrate not so far as unto the ventricle of the Heart, but that it consist in the substance thereof, the man may then indeed live for a while, but yet nevertheless he must necessarily die this violent Death.

Secondly, It is of necessity that the man die, if some Vessel be wounded in that part of the Lungs that are next unto the Heart, and that out of it store of Blood be poured forth unto the Heart, overwhelming it, and suffocating the heat thereof.

Thirdly, All the internal wounds of the greater Vessels that cannot by any art be closed up, in regard they cause (the Blood being plentifully poured forth either out of the Veins or the Arteries) that the spirits be suddenly dissipated, therefore of necessity they speedily suffocate the wounded person.

Fourthly, All those Wounds are said to be Mortal that suddenly take away the Respiration, and hinder the ventilation of the Heart, so that the Native heat of the Heart is suffocated, and so cause that the Man die even almost in the very same manner as Apoplectical persons are wont to die. And such like wounds are especially the Wounds of the Brain, but yet not all of them, since that there are many Wounds of the Brain that are not Mortal, as afterwards we shall shew you, and as we have already told you in the *first B. of our Practice, first part*, and 23. *Chapter*. But those great Wounds, and such as are the Cause that the Animal spirits be suddenly dissipated, or that the blood being poured forth of the Vessels the Orifice of the Nerves be quite stopped, and so by this means the influx of the Animal Spirits be hindered; or that from the same an inflammation of the Brain, or a feaver be excited. And this is not only done by the Wounds of the very Brain it self, but likewise by the strokes and vehement Contusions of the Head, by which the Vessels of the Brain (and those neer about it) are broken, and the Blood poured forth of them unto the beginning of the Nerves, and there subsisting hinder the influx of the Animal Spirits. And this may also happen, if the *Sinus* or hollow places of the Brain chance to be hurt, so that out of them blood be poured forth unto the Basis of the Brain; and so it is likewise in the Wounds of the Eyes, if they penetrate so deep that they open either the Vessels of the Brain, or those that are in the Basis thereof, or those that are neer about the said Basis of the Brain, and so that the Blood poured forth unto the Basis of the Brain hinder the influx of the Animal spirits by compressing the beginning of the Nerves. For although that the Blood (if it be poured forth above upon the Brain) may possibly be emptied forth by perforating and opening of the Cranium or Skul; yet nevertheless if it be poured forth unto the Basis of the Brain, it is impossible that it should ever be evacuated.

There seemeth yet (nevertheless) to be another way, whereby the Blood poured forth into the Brain, or about the Brain, bringeth Death within a very few daies, if it cannot be evacuated. For when as it is without the Vessels, it beginneth to putrefie usually about the fifth day; from whence feavers, deliries, and Convulsions are excited; so that the man dieth in the same manner almost as one in a Phrensie.

That which is done by the Wounds of the brain, the very same happeneth likewise from the spinal Marrow, if it be indeed wholly cut assunder in the superior part thereof: for then the motion of all the inferior parts (and so of the *Thorax* likewise) is abolished, and the wounded persons are suffocated. And unto one of these four waies I conceive that al kinds of Mortal Wounds may be referred. And therefore if a Wound penetrate into any interior part of the Body, so that thereupon the wounded person die within a short space of time, we are then to Judg that that Wound was Mortal; and if diligent inquiry be made, I am of Opinion that it may be referred unto some one kind or other of these Mortal Wounds: whether that Wound hurt the vital faculty it self immediatly; or else hurt it by the intervening of some other Disease, or Symptom. For, as *Nicolaus Boetius* writeth out of *Felinus* (in his 323. *Decision, Numb.* 10.) it is all one, whether a Wounded man die of his Wound, or of some infirmity caused by the same. Which yet nevertheless is so to be understood, if the Wound necessarily attract that Disease, or that Symptom which is the Cause of Death.

But as for all the other Wounds whatsoever that cannot be referred unto some one of these manners, I conceive that they cannot simply nor necessarily be accounted Mortal. The which that it may be made the more plainly to appear, we have it now in our purpose, in special to weigh and discover unto you the Wounds of all parts that are to be accounted Mortal.

What wounds accounted Mortal by Hippocrates.

Now *Hippocrates* Judgeth the wounds of seven parts to be Mortal, whilest (in his *sixth Sect. Aphor.* 18.) he thus writeth. *Whosoever hath his Bladder cut through, or his Brain, or his Heart, or his Midriff, or any of*

of his smal Guts, or his Stomack, or his Liver, that Wound is Mortal. Which *Aphorism* notwithstanding (in his *Coaca*, or his Tract of Playsters, *Aphor.* 509.) he both Limiteth and Amplifieth, when he thus saith. *From a Wound even Death it self may almost happen, if any one be wounded in his Brain, or in his spinal Marow, or in his Liver, or in his Midriff, or in his Heart, or in his Bladder, or in any one of the greater Veins. Death likewise soon followeth, if any extraordinary great Blows be inflicted upon an Artery, and upon the Lungs; so that the Lungs being wounded, the Breath that passeth out at the Mouth is less then that which issueth forth at the Wound. But they suddenly perish whosoever they are that have received a Wound in the interior Nerves, whether smal or great; if the Blow or Wound be both Transverse and great: but if the Wound be but smal and straight there are some that escape the danger. But there is neither Death nor any great danger impending from those Wounds that are inflicted on those parts of the Body in the which there are none of these, or which are as far distant as may be from these*

Indeed he limits the Aphorism, whilest that he doth not simply write that such like wounds are altogether Mortal, but *almost* and *for the most part.* He amplifyeth it, whilest that he addeth the spinal Marrow, the greater and thicker Veins, the rough Artery, and the Lungs, and the interior Nerves. And therfore we wil in order consider the wounds of these parts. For it is without doubt, that the Wounds of the rest of the Parts are not at all of themselves Mortal: and this *Hippocrates* himself teacheth us in the *above mentioned Aphorism, 509. in Coacis. Celsus* (in his 5. *B.* and 26. *Chap.*) thus rendereth the foresaid Opinion of *Hippocrates. He cannot possibly be preserved,* that hath *the Basis of his Brain, his Heart, his Stomack, the parts of his Liver, the Marrow in his Back-bone, wounded: or that person that hath either the middle of his Lungs, or the* Jejunum. (i. e. *the hungry Gout*) *or any of the smaller Guts, or the Stomack, or the Reins be wounded; or he that hath the greater Veins or Arteries about his Jaws cut assunder. And they also very hardly recover their former soundness that have any part of their Lungs, or the thick part of their Liver, or the Membrane that conteineth the Brain, or the Spleen, or the Matrice, or the Bladder, or any Inteſtine, or the Midriff, wounded These likewise are in extream great danger, in whom the Swords point hath pierced even unto the greater Veins that lie hid and concealed within, in the Arm-pits, or in the Hams. And those Wounds are also dangerous, wheresoever there are any of the greater Veins; in regard that they soon spend a man by the extraordinary effusion of Blood. And this happeneth not only in the Arm-pits, and in the Hams, but likewise in those Veins that reach even unto the Arse, and the Stones. And besides these, that Wound is also evil and dangerous that is in the Groins, or in the Thighs, or in the void places, or in the Joynts, or between the Fingers. As also whatsoever wound it be that hath hurt any Muscle, or Nerve, or Artery, or Membrane, or Bone, or Cartilage.* But now, because that *Hippocrates* what he had said (in the *sixth B.* of his *Aphorism Aphor.* 18.) to be *Mortal* and Deadly; that in his *Coaca, Aphor.* 509. he explaineth by saying that they *almost die,* let us therefore see what wounds of these parts are simply Mortal, and what not.

The wounds of the Brain.

And first of all, *Hippocrates* (in the *Sixth Book* of his *Aphorism Aphor.* 18.) reckoneth up the Wounds of the Brain among the Mortal Wounds; and yet nevertheless (in his *Coaca*) he limits it, and writes that for the most part this is so. For all the Wounds of the Brain are not Mortal. For *Galen* himself saw when such Wounds were Cured, in the 8. *B.* of the *Use of the parts,* and 10. *Chap.* and in the *sixth of the Aphor. Aph.* 18. And we have instances thereof in *Valleriola* in his 4. *B.* of *Observat.* and 10. *chap.* and in his 5. *B.* of *Observ. chap.* 9. and in his *sixth B.* of *Obser. ch.* 4. in *Gulielm. Fabricius* his 4. *Cent. Observ.* 1, 2, and 3. and he there giveth us a long Catalogue of the Physitians who had seen some Wounds of the Brain Cured. In *Johannes Andreas* a *Cruce,* in his *first B.* of *Wounds, Tract.* 2. *chap.* 14. of a *hurt* and wounded *Brain.* Yea Moreover it hath been observed, that after the loss and perishing of some smal part of the Brain, yet nevertheless the wounded person hath perfectly recovered: for the confirmation of which we have many Histories given us by Divers Physitians; *Anton. Musa Brasavolus,* in his *Comment.* upon the 18. *Aphor.* of the *sixth Sect.* of *Hippocrates, Nicolaus Missa,* in his *first B. Epist.* 11. *Fallopius* in his *Tract of the Curing of Wounds, chap.* 45. *Franciscus Arcæus, in his first B. of the Curing of Wounds,* and 6. *chap. Johannes Andreas* a *Cruce,* in his *first B. of Wounds, Tract,* 2. *chap.* 14. *Ambrosius Paræus* in his 9. *B.* and 22 *chap* and others; all which (or at least the greatest part of them) have been collected by *Schenckius,* in his first B. *Oserva.* 40. and 42. And well worth Observation also are the Histories of the most dangerous Wounds of the Brain, that are extant in *Cabrolius* his *Observat.* 16, 22. and 34. in *Henricus Petræus* his 2. *Tome* of *Harmonic. Disputat. Disput.* 36. *Quest.* 10. in *Gulielm. Fabricius,* every where very frequently in the

the *Centuries* of his *Observations*: in *Matthias Glandorpius*, in his *Speculum Chirurgic. Chap.* 22. *Observ.* 5. And I my self (together with a Chirurgeon) Cured a Carpenter, who in the left bone neer unto the Coronal Suture, had received a Wound (by a fal of the very edg of an Ax from on high) almost of a Thumbs length, that penetrated even into his Brain; so that a smal part of his Skul being presently broken forth, there appeared out a portion of his Brain, well neer as much as a Wall-Nut in quantity. And yet nevertheless he recovered, that portion of his Brain that hung forth by degrees wasting away. And (which made the wonder so much the greater) during the whole time of the Cure, he never so much as complained of any pain in his Head, nor of any other Symptom; and walk he could without any the least impediment. And of this truth there are so many examples already every where known, that to heap up more instances is a thing altogether superfluous. And on the contrary, that for the greatest part they die of these wounds of the Brain, is testified by daily experience.

And unto the Wounds of the Brain belong also those that (through the Bal of the Eye) are inflicted either upon the brain it self, or the parts neer adjoyning, and included within the Skul; as we shall afterward shew you.

But now, why the Wounds of the Brain are sometimes Mortal, and sometimes not, is well worth our inquiry. Some there be that think all those Wounds that penetrate not into the Ventricles of the Brain, not Mortal; but those that reach even unto the ventricles, these they Judg to be Mortal; and this, by reason of the suddain dissipation of the Spirits that are conteined in those ventricles. And *Galen* himself seems to be of the same Opinion, whereas he writeth (in the *sixth* of the *Aphor. Aph.* 18.) that a young Man of *Smyrna* in *Ionia* having received a Wound in one of the fore ventricles, yet scaped with life; whereas he could not indeed possibly have lived one Moment of time, if it had so chanced that the Wound had violated both the ventricles of the Brain at once. But that the ventricles of the Brain, being likewise violated, men may yet notwithstanding escape with life, we are sufficiently taught by the Histories before alleadged. Neither is their Reason good that are of the contrary Opinion. For neither are the Animal Spirits generated and conteined in the ventricles of the Brain, (as those of latter times have sufficiently demonstrated;) neither are the ventricles of the brain so separated and distinguished by Partitions, that one of them being wounded, the spirits (were they conteined in the said ventricles) may not likewise pass forth of the other.

That I may a little open this my Opinion; I account not those wounds of the Brain (although it be a noble part) to be Mortal and Deadly, only as they hurt the brain; but as, by Reason of the Wounds of the brain, violence is offered unto the Heart and the vital faculty, which is alone necessary unto life. For the brain is not the seat, and the instrument of the vital faculty, but of the Animal. From whence it is, (as *Brasavolus* testifieth, in his *Comment upon the* 18. *Aphor. Sect.* 6. and others also,) that from the Wounds of the brain the interior senses are often hurt, and a man sometimes loseth his Memory, and becometh stupid, the life al this while not much endangered, but abiding safe. But if by Reason of the Wounds of the brain the vital faculty be endangered, there is then a necessity that Death should follow. And this happeneth, when the beginning of the Nerves is shut and stopt (Whereupon *Celsus* in the *place Alleadged* saith, that simply the Wounds of the brain are not Mortal, but only when the Basis of the Brain is wounded) either by obstruction, or by compression, or else by dissection; and so a man, (the influx of the Animal spirits being denied him) dieth in the same manner as Apoplectical persons are wont to die: or otherwise the Membranes of the brain, and the Nerves being pulled and twing'd, there is a Convulsion excited. For even the very Convulsion it self (if it be vehement) exciteth most grievous Symptoms, continual pains, watchings, faintings, and swoundings, difficult breathing, and at length suffocation, upon which at last the man is Strangled and Choaked. And so in this manner such as are wounded in the Head do not indeed presently die the very first day, but afterward, when the blood that is poured forth out of its Vessels into the brain, or about the Brain, beginneth to putrefie, and so causeth an inflammation of the Bram, a Feaver, a Deliry or Dotage, and a Convulsion; and so at length destroyeth the Person.

And this is done by those Wounds that are inflicted upon the Brain, (in what manner or by what way soever it be done) to wit, whether by the Cranium or Skul, or by the hollow of the Eye, or any other way they penetrate unto the Brain. There is indeed (out of the 9. *B.* of *Paræus* his *Chirurgery*, and *Chap* 9.) a History alleadged of Henry the second, King of France, who in the yeer of our Lord 1559. (in a Tilting,) from the Trunk of a broken and disshivered Lance received a Wound upon his right Eye-brow, in the

Musculous

Musculous Skin of the fore-head, even unto the lesser Angle of the left Eye; many shivers of the same Trunk being gotten into the substance of his Eye, and yet nevertheless the bones all this while remaining whole and entire. But in regard that the hollow of his Eye was whole and sound, and that the wound of his Eye pierced not unto the brain, he could not be said to die of the wound of his Eye, but of the Commotion of his brain; which the very opening of the Skul did plainly discover. For dying the Eleventh day after the receiving of this Wound, his Skul being opened, there was found in the part opposite unto the blow, at the middle Suture of the hinder part of the Head, great store of blood poured forth between the two *Meninges* or Membranes of the brain; which putrefying and corrupting the Brain without all doubt was the Cause of the Kings Death.

And I my self lately saw here a Mortal Wound of the Eye in a certain Citisen, who received a wound (from a sharp and keen Sword) about the external Angle of his right Eye; and (the Eye still remaining safe) through the round place or hollow of the Eye, (by which the optick Nerve entereth into the Eye) penetrating very deep, even as far as the brain it self; whereupon the Vessels being here and there cut in sunder, there issued forth great store of blood into the substance of the Brain; upon which wound, this Man (after the manner of Apoplectical persons) being suddenly astonished falleth down; and about the ninth hour after he died.

The wounds of the spinal Marrow.

Secondly, As for what concerneth the wounds of the spinal Marrow, seeing that the spinal Marrow (in the parts Scituate under the Brain) discharged the Functions of the Brain, as its vicegerent, and hath a substance and Membranes in common with the Brain; in the same manner as the wounds of the Brain, so may likewise the Wounds of the spinal Marrow be Mortal; to wit, if it be wounded in its superior part; which part being hurt, the influx of the Animal spirits into the whole body may be hurt; and hereupon the sense and motion in all the parts that are under the Head, (which receive their Nerves from the spinal Marrow) may be taken away; and so, consequently, the very breathing it self may likewise be abolished. I knew a certain Butcher, who when he was to kill any Beasts, did not (according to the usual manner) knock them down with an Ax, but thrust in a little Knife into the spinal Marrow, in that very place where the Head is conjoyned unto the Vertebræ of the Neck, upon which the Beast being as it were astonied, immediatly falleth to the ground. But this is more especially done by those wounds that transversly cut assunder the whole spinal Marrow; and so hinder the influx of the Animal spirits into all the inferior parts, or else cause an Universal and Mortal Convulsion of the Body. And such like wounds are especially those that are inflicted upon the Neck, in the interior part, by which the Vertebræ are in a manner disjoyned, and not united very deeply, but for the more easie motion as it were tied together by a certain Mucous and Nervous bone; from whence it cometh to pass, that when the Neck is wounded by a vehement blow, the very Marrow it self may likewise be touched. But if the wounds be inflicted on the spinal Marrow in some lower place, they then are not necessarily Mortal; and by how much the more there are preternatural dispositions in the inferior part of the *Spina*, by so much the less hurtful are they, as *Galen* (in his *fourth B.* of the *places affected*, and *third Chap.*) teacheth us. For although even then also, pains, want of Rest, Inflammations, (and other Symptoms that have in them a power of bringing Death upon the sick person) may possibly supervene; yet notwithstanding those wounds are not to be accounted simply Mortal; since that it may so be, that such like Symptoms may not supervene.

The Wounds of the Heart.

Thirdly, The wounds of the Heart are accounted among those that are Mortal, and indeed most rightly they are so to be esteemed; since that all the wounds of the Heart necessarily or simply are mortal; in regard that they hurt the store-house and fountain of the Blood. And this (as *Galen* writeth in the *sixth of the Aphorism. Aphor.* 18.) is a truth confessed even by all. And in very deed, the wound of the Heart that is great and deep, and such as penetrateth into the ventricles thereof, suddenly killeth; but that which is but smal, and subsisteth only in the flesh of the Heart, and penetrateth not so far as its Ventricles, this likewise destroyeth the person, but not altogether so soon. For the ventricles being opened, there followeth a sudden effusion of the Arterial blood, and a dissipation of the vital spirits; and this especially upon the opening of the left ventricle. But if the Wound be in the substance of the Heart, and shal not have pierced unto the Ventricles thereof, a man may then indeed sometimes live a whol day; but yet nevertheless soon after, (as in a place most hot, and ful of blood and spirit) first an Inflammation, and then upon it a *Syncope*, and Death it self followeth. Neither was it ever found, that any one after the wounding

wounding of the Heart did long survive. For although it hath indeed been observed, that Tumors and Ulcers have been found in the Heart; yet those seeing that they arise and grow by degrees, life may sometimes for a while persist together with them; although that in the conclusion even these also bring Death unto the Party. But wounds, in regard that they suddenly disturb the very frame and Oeconomy of the Heart, the life cannot therefore long persist with these. And albeit *Galen* (in his 2. *B. of the Decrees of Plato* and *Hippocrates*, and 4. *Chap.*) relateth that sacrifices at the Altar (after the heart hath been cut forth) have been heard to cry: yet notwithstanding this lasteth so long only as the vital spirits are remayning in the Arteries; which being exhausted, soon after the Beast fals down and dieth. For as *Aristotle* writes in his *third B. of the parts of Animals*, and 4. *Chapter*) *the Heart alone of the Bowels, and of all the parts of the Body, will not admit of, or bear any great injury; and this for very good Reason. For when the very principium or principal part of all is corrupted and injured, it cannot then possibly afford any aid and assistance unto those other parts that depend thereupon.* And more especially (as hath been said) the left ventricle of the Heart (which is the storehouse and treasury of the Blood and the vital Spirit (being wounded, the wounded person immediatly perisheth. But if the right ventricle of the Heart be wounded, that the wounded person may in this case lengthen out his life for some short time is confirmed unto us by a strange (but yet true) History that we may finde written in a Table hanging up against a Wall in the Library of the University of *Groning*; and as it is described by *Gothofredus Hegenitius in Itinerario Frisic. Hollandico, Page* 16. in these very Words.

Nicholaus Mulerius, *health to the Reader.*

It hath hitherto been beleeved, that the heart being wounded no man could possibly lengthen out his life, no not for the short time of one hour. Which opinion both Reason and Experience confirm. For seeing that our life dependeth upon the safety of the spirits (whose Store-house and Fabrick is Scituated in the very Heart) the Heart being wonnded, the said treasury and fabrick that is Scituated in the same must of necessity be wounded likewise. But I thought good here to relate unto you a very Memorable History; a History (I say) of a certain Soldier, who being wounded at the Heart, yet lived above fifteen daies after; the like whereunto we meet not with in any of the observations of either Ancient or Modern Physitians. Andreas Haesevanger, *being a Soldier enrolled in the City Garison under the most Illustrious Count* William *of* Nassau, (*Chief Governour of* Frisia, Groning, Omland, &c.) *received a wound in his breast from a fellow Soldier of his, in the year* 1607. *the two and twenty day of* August, *in the evening; and he died the eighth day of* September *following, an hour after Sun-rising; it being the sixteenth day from that whereon the wound was given him. The Body of this dead Soldier by the command of the Governour of the City Garison, for the discovery of the Nature of this his wound, was opened and examined by my self and two Chirurgeons,* Gaspar *and* Luke Hulten, *there being present and looking on that valiant and most Noble* Bernhard Hoornkeus; *there looking on likewise some others both of the meaner and better sort of Soldiers. We had no sooner opened the Cavity of his Breast, and emptied forth no smal store of purulent matter that stank not much, but behold, we found to our great admiration, that the Wound had penetrated even into the right ventricle of the Heart; and that the aforesaid part of the Heart was almost all of it withered and wasted away, the left part stil abiding safe and entire; in which is conteined the Primary Store-house and treasury of the vital Spirits. And therefore by the benefit of this alone the life of this* Soldier *was preserved even unto the sixteenth day, in the morning. And lest (haply) that this relation should not be Credited by some, the most Noble and Illustrious persons before mentioned* (Bernhard Hoornkeus, *Governour of the City Garison, and* Petrus Pappus, *the Military Prætor,) have confirmed the same by their Testimony and the subscription of their Hands. And the latter of them hath likewise made an exact narration of this History, in his learned Commentaries upon the Military discipline. Done at Groninga the* 22 *day of* June, *in the year,* 1627.

I Bernhard Hoornkeus *do attest what is above written: this* 22 *of* June, 1627.

I Petrus Pappus von Tratzberk *do attest, that this History is true; and that I my self very well know it to be so.*

And therefore what is related by *Matthias Glandorpius*, in his *Speculum Chirurgicum, Chap.* 23. touching *Sanctorius* a Professor at *Padua*, that struck a Coney through the Heart with a sharp instrument, the Coney still remaining alive for many Months after; this without doubt being to be understood of the right ventricle of the Heart; it happening withal likewise, that the instrument

(out of all question) was not broad, but narrow and sharp-pointed.

VVounds of the Lungs:

Fourthly, The Wounds of the Lungs, *Hippocrates* indeed reckoneth them up in the number of those Wounds that are Mortal, in the *place before alleadged*, in *Coacis*; and yet nevertheless he doth not absolutely and simply pronounce all the wounds of the Lungs to be Mortal, but he himself addeth a Limitation; to wit, this, if the wound shall be so great, that *the Lungs being Wounded there passeth forth less of the breath by the Mouth, then there issueth forth of the Wound.* And that all the Wounds of the Lungs are not Mortal, we are oftentimes taught by experience; which evidently confirmeth it unto us, that many who have been wounded through the whole Thorax, and the Lungs, have yet notwithstanding escaped with their lives, and recovered their former health and soundness. And I my self saw an example of this in a certain Student, who in the year, 1623. in the Month of *July*, in the night received a wound, by a narrow sharp pointed Sword run through his Breast on the right side thereof, about the Third short Rib, neer unto the Arm-pit, and coming forth opposite unto it neer unto the *Spina*; so that he sent forth by the wound much Breath, with a great noise; and yet notwithstanding this man recovered, and was well again within the space of a month; and even now also, (in this year, 1634. wherein I am writing these things) he is in good health and strength. Yea, *Gulielmus Fabricius* (in his 2 *Cent. Observat.* 32.) out of a History imparted unto him by one *Abel Roscus* (which is as followeth) telleth us of the Cure of a wound in the Lungs that was far more dangerous then the former. The story is this. *There was* (saith he) *among the Delphinates, in the town of* Calmuntium, *a certain person grievously wounded in his Breast (the wound being made by the prick of a Sword) betwixt the fifth & sixth ribs of the breast, not far from the Sternum or Breast bone; in whom when the Sword by its broad point had lightly pierced through even the very Lungs, in the drawing of it forth, I know not by what ill chance it being turned round it brought forth along with it through the wound a final portion of the Lungs; whereupon immediatly all the standers by adjudged the Wounded person to be at the very point of Death. In the mean time, the Physitian (together with a Chirurgeon) being sent for, so soon as he was come, instantly commanded that the part of the Lobe of the Lungs that hung forth, (being first well washed in Wine) should again be thrust back into the Breast. But in the handling thereof, perceiving that it began to look blackish and wan, he caused it to be cut off with a red hot Iron Instrument. But as for the Rest of it, the Chirurgeon gently thrust it back again into the Breast, the Ribbs being first dilated with a Wooden wedg that was instantly provided for that very purpose. And then after this, by the Art and Medicaments prescribed by the Physitian, he was Cured; there being withal external means administred, and some certain pectoral Decoctions of Vulnerary Herbs for a few daies inwardly drunk; and so the wounded person perfectly recovered; and after this lengthened out his life for many years, his Lungs and Breast all the while continuing still very sound, and altogether free from all manner of hurt and detriment. And therefore we may conclude that the Wounds of the Lungs are not alwaies of themselves Mortal, or incurable; unless haply a deep Wound therein be affected with an Inflammation; or else when the Wound hath hurt the great Vessels, or the Lappets thereof; or that the wound reacheth neer unto the Heart.* And many other such like Histories *Schenckius* (in the 2. *B.* of his *Observat.*) relateth out of *Franciscus Valleriola* his *fourth B. Observat.* 10. *Nicolaus Massa, Franciscus Arcæus, Fallopius,* and *Foresius*: and the like are to be seen also in *Guliemus Fabricius* his 3. *Cent. Observat.* 36. and *Cent.* 1. *Epist.* 52. and others: all which here to recount would be too tedious. And the like History is related also by that excellent and expert Physitian Doctor *George Horstius*, (in his 3. *B. Observat.* 11.) in these Words. *A certain Noble youth* (saith he) Abraham *a* Schleinitz (*a Knight of* Misna) *living with us at* Giessa, *as a student, in the year, 1613. goeth to the House of a certain Citisen, upon his Birth day, which the Citisen (as it seemeth) was wont to observe in a festival manner; others in the said House by Quarrels and Threats having given an occasion of a Tumult; thither being come through a Chink of the Door he was run through his Body with a very sharp Sword, the entrance of the Wound being not far from the* Sternum, *about the Third or Fourth superiour Rib, and the Sword going forth again under the Shoulder blade, not far off from the Spina. I being called about the first hour of the Night, found that his Pulse was very weak, and that there was present a difficulty of Breathing; whereupon I had but smal hopes of him, as conceiving very great danger to be at hand, by Reason of the grievous hurt of his Lungs, and the great Vessels. But see what happened. A vomiting taking him suddenly (without any means used to procure it) all the grievous Symptoms ceused, and his strength by degrees returned; there being no purulent Spittle at all that offered to come forth; his Cough likewise and difficult breathing were not very urgent and troublesom; neither for the first Week did*

did any heat and thirst very much affect the sick person: in the interim, the wounds being handled after the Usual manner, there daily flowed forth an indifferent Quantity of well concocted pus or purulent matter. These means being continued unto the second month, and the External wounds being purified and consolidated, the sick person was suddenly taken with a most dangerous suffocation; so that he was in great peril of being strangled by an Asthma as it were; and he was likewise very much afflicted with a cough, Atrophy, and Hectick Feaver, until at length the impostbume of the Lungs brake, and with the Cough five or six pints of purulent matter were cast up at his mouth; after which, the exulceration of the Lungs being cured by fit and proper Remedies, the consumption, Fever Hectick, and all the rest of the symptoms remitted, and the Patient was restored unto his perfect health.

To wit, those Wounds of the Lungs are not mortal, in which only the substance of the Lungs is hurt, and not the great vessels; and such as are not so great that they abolish respiration, or suddenly destroy the vital faculty, either by their dissipating the sprits through some notable Hemorrhage; or else suffocating the heart, by pouring out the blood upon the Lungs, and upon the heart. On the contrary, if the wound of the Lungs be great, and that not only the substance of the Lungs, but likewise the great vessels that are therein (to wit, those notable and observable branches of the Arterial vein, and the veiny Artery, be wounded; those wounds are mortal, being such as in which the blood and vital spirit is poured forth and dissipated, or else through the overgreat abundance of the blood the Lungs and heart are oppressed, and the Patient suffocated. *Hippocrates* (in *the place alleadged* in *Coacis*,) addeth yet another cause of death; which yet nevertheless doth not bring so sudden a destruction unto any person, as those in the former case even now mentioned; where the wound being great, it is not the vessels containing the blood that are indeed hurt, but the great and rough Artery; so that by reason of the largness of the wound there is more breath that goeth forth by the wound then by the mouth; for then by reason of the sympathy the heart is affected, the vital spirits dissipated, the Lungs and heart by the ambient Air altered and offended. And indeed those wounds of the Lungs bring death likewise, in which either the substance of the Lungs beginneth to be exulcerated, (and that a Consumption is excited) or in which the blood is poured forth into the Cavity of the Thorax, where it beginneth to putrefy, and where it causeth either a feaver, or an *Empyema*. But in regard that this doth not alwaies happen, and not at all in some wounds of the Lungs; and that likewise (when it doth happen) there is no necessity that the Patient die; for this cause therefore those wounds of the Lungs are not to be accounted necessarily Mortal. For *Felix Platerus* (in his 3. B. of *Observ.* Page 690.) relateth, that a certain person that he knew, falling into a Consumption from a Wound of the Lungs, was yet nevertheless Cured and perfectly recovered. *A certain Coffermaker (sayth he) one of our Citizens, having from a servant of his received a wound very deep in the lowest part of the Thorax by a prick from the point of a knife, by the wound he voided forth a most stinking and loathsom pus or matter (by the ill savor whereof the whol neighborhood was infected and offended, and likewise some certain smal parcells of his Lungs, in which the cartilaginous branches of the rough Artery did manifestly appear: which persevering a long time, albeit that he was in a manner wholly wasted away, yet nevertheless at the length the flowing forth of the purulent matter remitting, the wound was closed, and he restored unto perfect soundness; living after this many years as a foot-post, in carrying of letters; and thus he prolonged his life for forty years safe and sound, as we say; although (as it is very probable) he wanted great part of his Lungs in one side.*

The wounds of the rough Artery,

Fifthly, That the wounds of the great rough Artery (commonly called, *Aspera Arteria*) are not mortal, but that they may be cured, even the Laryngotomy, or Cutting of the Laryinx (of which we have spoken before, in the *Second Book of our Pract. Part.* 1. *Chap.* 24.) doth evidently demonstrate: To wit, those of them are cured that are not great, and in which the membranes only (by which the rings of the rough Artery are fastened and linked together) are wounded; examples of which *Schenkius* (in the *Second Book Of his Observat.*) hath collected. And I my self also have twice seen such like wounds cured. But if those very cartilaginous rings be wounded, by reason of their hardness the part cannot again be made to grow together as formerly, as *Hippocrates* teacheth us in the sixth of his Aphorisms, Aph. 19. And in the seventh of his Aphorisms, Aph 28. and *Galen*, in Book 5. of his method of Physick, Chapt. 7. And yet notwithstanding such like Wounds do not cause a sudden death, but a slow and lingering one; while that the Lungs are either altered and weakned by that Air that violently breaketh in upon the Lungs thorow the wound; or else that a certain smal gob-

bet of flesh grow unto the wound, which by intercepting the breath at the length choaketh the Person. But those wounds alone of the rough Artery throttle the Party, in which the jugular veins and Arteries being hurt the blood violently and al at once rusheth into the Lungs, intercepteth the breathing, and so suffocateth the wounded person; which yet nevertheless happeneth not by reason of the wound of the said rough Artery, but by reason of the wound of the Jugular vein, or the soporal (*i. e.* more plainly the sleep-conveying) Artery, that is very neer unto it.

Wounds of the Diaphragm.

Sixthly, *Hippocrates* reckoneth up the Wounds of the Diaphragm among those wounds that are mortal. But *Galen* (in his Book 5. of the *Method of Physick*, *Chapt.* 9. distinguisheth between those wounds of the diaphragm that are inflicted upon the nervous part therof, & those that are made in its fleshy part; and those he wil have to be mortal, but these latter Curable. And yet nevertheless (in the *Sixth of the Aphorism. Aph.* 18.) he writeth, that the wounds of the nervous part of the Diaphragm are not alwaies mortal; but that the great wounds therein are only so. For then it is indeed that those grievous symptoms plainly appear, *viz.* a deliry or stupid dotage, difficult breathing, Feavers, Convulsions, and (as *Aristotle* hath likewise observed in his third Book *of the parts of living Creatures and tenth Chapt.*) the *Sardonian* Laughter, wherin the sick persons die laughing. For whereas the Diaphragm receiveth Nerves from the third and fourth vertebra of the Neck, and that these are mingled with those smal branches that are propagated throughout the Muscles that move the Jawbones, and the Lips; if they suffer a Convulsion in that part by which they reach even unto the Diaphragm, they then contract and draw together along with them those little branches of the Muscles of the face; by which the Jawbones, and the lips being in voluntarily moved to and fro, hither and thither, cause a resemblance and seeming appearance of laughter; which *Hippocrates* (*in the* 5 *of his Epidem.*) accounteth among those signs that are deadly, by the Example of *Tycho*, whom he bringeth in for an instance.

And yet nevertheless, neither are those very wounds that are also in the nervous part of the Diaphragm alwaies mortal, so far forth indeed that the party wounded in that place must of necessity presently die: albeit we grant it to be a thing altogether impossible that those who are thus wounded should ever be perfectly cured, or live long in that manner. A notable instance and history of this (which I have likewise before related in the second Book of my *Institutions part.* 2. *Chap.* 13. and in the second Book of my *Pract. Part.* 2. *Ch.* 15. was given me by my Father in law, Doctor *Andreas Schato*, sometimes Physick Professor in this University of *Witteberg*; which I must not here in this place pass over in silence. Take it therefore thus: *In the year* 1582, *the* 20. *of* September, *a certain Student, by name* Henricus Euscherhovius, *returning out of the lower Saxony unto* Witteberg, *and much addicted to Melancholy, before the gate ran himself through with his own sword. But yet notwithstanding within two monthes he was cured of this wound. But the yeer following, the* 28. *of* April, *he began again to be much amiss; and the days following he vomited very often, first a certain water, and whatsoever food he had eaten; then after that such things as were green; and at length, on the second of* May, *his vomitings were altogether black, and that in very great abundance; and so after the last vomit the same second day of May he died. We opened his Body, and there we found that the wound had penetrated thorow the Lungs, and the Diaphragm; and (as it seemed to us) the Diaphragm was run thorow in the Nervous circle. We found very little or nothing of his Lungs on the left side that was run thorow, but only a very smal portion thereof which stuck above unto the short Ribs; the rest of it (no doubt) had gone forth thorow the wound together with the purulent matter. The whole stomack was ascended into the left side of the Thorax; and it had driven the Heart (with its Case,) out of its proper place into the right side; where while he was yet alive, and after the wound was restored unto a good degree of health, he would wish us to observe the motion of his heart by putting our hands there.* An instance not much unlike unto this we have in *Ambrosius Paræus* his ninth Book, and *Chapt.* 30. Of a certain Captain that was (by a bullet shot out of an hand-gun) wounded and shot quit thorow the *Diaphragm*, but it was in the fleshy part thereof; who dying eight months after this wound received, we found in his dead body (when we had opened it) that a very great part of the Gut Colon, being puffed and swoln up with much wind, had thorow the wound of the Diaphragm gotten up into his Thorax.

Wounds of the Stomack

Seventhly, As for the wounds of the Stomack, for the most part they are not to be recounted in the number of the wounds simply Mortal, and which suddenly strangle and destroy a man; since that we have every where exstant examples of wounds in the stomack that have been cured. That History is generally wel knowen which is related both by *Juli-*

us Alexandrius, in the fourth chapter of his sixth Book of *Galen* his *Therapeutick method*; and likewise by *Matthias Cornax* in his *Epist. in answer unto* Dr. *Ægid. Hertogh*; of a certain Bohemian Boor, who received a wound in his stomack, (and that from a broad hunting spear) and yet notwithstanding lived a long while after: this story we told you a little before, and therefore shall say no more of it here. Neither is that other history unknown, of a certain Boor in Bohemia; which as others have related it, so we find it likewise mentioned by *Crollius*, in the preface to his *Basilica Chimica*; *in these very words. In the year* 1602. *at* Prague, *in the new Town, we saw a certain Bohemian Boor (by name* Matthæus*) about thirty six years old: who for two years together (by an admirable and unheard of dexterity that he had in his throat) would oftentimes in the company of his drunken companions hide in his wide throat (as it were in a sheath) an Iron knife of a fit size, First of al thrusting in the horn haft thereof, with the wonted sleight of a Jugler; drinking upon it a large draught of beer that they gave him for this purpose; and afterward he would pul it back again by the point thereof, at his pleasure, by a singular art and dexterity that he had: but at length (the morrow after Easter) I know not by what unhappy and mad rashness of his he had swallowed it so far down, that it wholly descended into his stomack, and could no more by al his art and cunning be from thence drawn back. And after that (half dead in a manner with the apprehension of death undoubtedly and suddenly to follow) he had lodged in his stomack the said knife seven whol weeks, and two days, by the use and help of attractive emplasters of the Loadstone, and other the like, the point of the knife by a natural impulse began to make its way forth neer unto the orifice of the stomack: which was no sooner perceived by the patient, but he instantly and earnestly requested of the Chirurgeons (who notwithstanding dissuaded him from it, by reason of the extream hazard of his life thereby) that it might by cutting be drawn forth. Which at the length upon his continual importunate desires (and yet not untill such time as he was come unto a most desperate Condition, both in respect of his poverty and weakness) was yielded unto; and the business undertaken by the principal Chirurgeon both of the kingdom, and that City,* Florianus Matthias *by name, a Brandeburger, on the thursday after the feast of Pentecost, at seven of the clock in the morning; and by him (with Gods assistance) it was happily effected. The colour of the knife after he had cut it forth (it being as long as nine thumbs in breadth) was so changed in his stomack, as if it had layn all that while in the fire, and was immediatly laid up among the Rarities of the Emperour, having been first shewn (a thing most strange, incredible, and miraculous) unto many men, as well Courtiers, as Citizens. And thus this Boor in the space of a few weeks (by the use of fit and convenient remedies, administred unto him by that most expert Chirurgeon) without any further sickness and trouble, alwaies eating wel, and drinking, and sleeping (as somtimes he told me himself) by the blessing of God, and the liberal Charity of many people toward him in his low and poor condition, (contrary unto the determinate assertion of Physical Aphorisms) fully recovered his wonted perfect health and soundness; and not long after he married a Wife.* But those wounds of the Stomack are especially mortal that are inflicted upon the superiour orifice thereof; in regard that it hath those considerable Nerves that arise from the sixth Conjugation of the Brain, and thereby obteineth a very neer consent with the Brain and Heart; so that it being wounded, most grievous Symptoms may very eatily be excited. And *Benivenius* (in his *tenth B. of the hidden Causes of Diseases that are curable Chap.* 110.) reporteth, that a certain Fuller with one blow of his fist upon the Stomack of a young Man, smote him so violently, that he immediatly died thereof.

The wounds of the smal Guts.

Eightly, The Wounds of the smaller Guts are by *Hippocrates* accounted and reckoned up among those that are Mortal. And more especially, the wounds of the *Jejunum* or hungry Gut (among al the wounds of the Intestines) are especially Mortal, by Reason of the greatness of the Vessels, and the almost Nervous substance of the Tunicle of that Gut; from whence for the most part there follow great torments and pains of the Intestines, Sobbings, and Faintings; as is to be seen in the Histories related by *Valleriola*, in his 2 *B. Observat.* 8. *and* 9. And indeed the wounds of the smaller Guts are then most especially incurable, when the said Guts are wholly cut assunder in a transverse manner; since that the Lips thereof standing wide one from the other cannot possibly by any means be Joyned, and made to grow together.

But now the wounds of the thicker Guts are less dangerous, and especially if they be not great: and that oftentimes such like wounds have been Cured, appeareth from the many extant Observations of Physitians: which *Schenckius* (in his *Observations*) *hath Collected.*

Ninthly, *Hippocrates* likewise accounteth the wounds of the Li-

Wounds of the Liver.

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ver in the number of such as are Mortal; which yet nevertheless wanteth a limitation. For *Ægineta* hath truly told us (in his 6. *B.* and 28. *Chap.*) that the Liver having been wounded, and a part thereof cut away, yet that the wounded person may be preserved. And *Gemma* relateth (in the *first B. of his Cosmocrit.* and 6. *Chap.*) that a Spanish youth a great part of whose Liver brake forth by the wound of the right Gut, was yet notwithstanding Cured. And *Bertinus* also (in his 13. *B.* and 7. *Chap.*) writeth, that a Noble person after a wound inflicted neer about the Region of his Liver, and a smal part of the substance thereof drawn forth and cut off, yet escaped, and became sound again. And the same hath likewise been observed by others. *Guilhelmus Fabricius* (in his 2 *Cent. Observ.* 34.) relateth that a certain *Helvetian*, thirty years old, in a Duel, was with an Helvetian Sword hurt in that part that is opposite unto the Liver; and that he received a very great wound one spanlong and that hereupon there was taken from him a good big piece of his Liver. And yet nevertheless this Man (notwithstanding the supervening of most grievous and violent Symptoms) by the blessing of God was perfectly recovered. And *Matthias Glandorpius* (in his *Speculum Chirurgic. Observ.* 34. *Page* 166.) hath a History of a youth dangerously wounded in his Liver, who yet nevertheless recovered perfect soundness. And yet notwithstanding we say, that they only recover, who have the superficies alone, or the substance of their Liver only wounded, without any hurt at all of the great Vessels. For if there be wounded any one of the greater Vessels, the wounded person cannot possibly escape; and by reason of the large effusion of the Blood, the Man (before that the wound can be Sodered and Agglutinated) dieth. And of these some indeed for a very short time have their life protracted; but others of them die in an instant, or at least, in a very short space. For (as *Hippocrates* in his 5. *Epidem.* telleth the story,) a certain person having had a dart thrust into his Liver immediatly the colour of a dead Carcass was dispersed all his Body over; his Eyes sunk in his Head, a difficulty of breathing (together with an æstuation or sudden vehement passions) followed after this; and the same day he died. Another Boy being strucken upon his Liver by a Mule, died the fourth day after; and before his Death he was troubled with a short and thick breathing; neither understood he any thing; but all the while (until he died,) lay under a feaver.

Wounds of the Spleen. Tenthly, The Wounds of the Spleen are almost of the same Nature, and alike dangerous as those of the Liver. For, if only the *Parenchyma* of the Spleen be wounded without any hurt of the Vessels, the wounded person may possibly escape. But if the Vessels of the Spleen be wounded, such like wounds are not only dangerous, but also deadly and Mortal. For seeing that the Spleen hath store of Veins, and especially of Arteries, these being wounded, by Reason of the great effusion of Blood, and Dissipation of the Spirits, the wounded person must of necessity perish.

Wounds of the Bladder. Eleventhly, The Wounds of the Bladder are likewise found in *Hippocrates* his Catalogue of Mortal Wounds. But yet nevertheless here also a distinction is requisite. For a smal wound is soon sodered together by the intervening of flesh, as *Galen* (in the 6. of the *Aphorism. Aph.* 18.) and Experience teach us. But if the whole Bladder chance to be cut quite through (which wound *Hippocrates* calleth *Diacope*) the Wound is then yet more dangerous. And indeed that is most especially perillous which is inflicted at the very bottom of the Bladder, and the Nervous part thereof: for by Reason of the sharpness and extremity of the pain, the inflammation following thereupon, and the continual feaver, the party dyeth soon after. But as for these Wounds that are inflicted at the Neck of the Bladder (which is fleshy) they are Curable; as we are taught even by the Cutting of the Stone. And yet nevertheless it hath been observed, that the Bladder wounded even in the very bottom thereof hath likewise been Cured; the truth of which we have confirmed unto us by those examples we meet with in the *Observations* of *Schenckius*. For the whole Bladder is not altogether Nervous, but the Exterior Membrance thereof is more fleshy; whereupon *Hieronymus Fabricius ab Aquapendente*, and *Spigelius*, account the said Membrane for the Muscle that shutteth the Bladder. But it is very rare that such a like wound of the Bladder is perfectly Cured, albeit that the wounded person die not thereof; but a Callousness being brought over it, the Pipe still remaineth, by which the Urine is voided forth. But yet nevertheless it is not long that a man can continue to live with such a like wound and therefore we say here again as we said also before, that there is a difference to be made between a wound Mortal, and a wound incurable. But yet notwithstanding, touching al the Wounds of the bowels hitherto mentioned, this is to be observed; that albeit there have been observed some examples of such like wounds that have been Cured; yet that this hath happened very rarely; and that among these, those are to be numbered, touching which *Averrhoes* saith,

saith, that in the Cure of Diseases there are sometimes Miracles wrought. For when fit and proper Medicaments cannot be applied unto internal wounds, but that the whole work must be committed unto Nature; if in this Case Nature be not very strong and Vigorous, the wounded person is very hardly Cured; but for the most part an inflammation, Convulsions, Faintings and Swoundings, and other the like Symptoms supervening, the party dieth. And therefore *Hippocrates* saith rightly (in the *sixth* of his *Aphorisms*. *Aphor.* 18.) that such wounds are Mortal; and (in his *Coaca*) that most commonly and for the most part, men die of such Wounds. And therefore if upon the receiving of such a wound, the sick person die within a short time after, the Cause of his Death ought to be imputed unto the Wound; since that much help is not to be hoped for from the Physitian, as we shal also anon shew you.

Wounds of the great Veins.

And Lastly, *Hippocrates* reckoneth up the Wounds of the greater Veins among those that are Mortal, and indeed rightly. But now by the word *Phlebæ* he understandeth both the Veins and Arteries; and by *Pacheis* he meaneth great, and lying hid within; which elsewhere he termeth *Aimorrhous*, that is to say, *pouring forth Blood*; such as are, the great hollow Vein, and the great Artery, and the great branches of these. For such veins and arteries, seeing that they cannot be shut close by any ligature whatsoever, (the blood and the spirits plentifully flowing forth of them) the strength and powers of the Body are soon dejected; or else the blood that is fallen forth without its own proper Vessels, if it hath no passage forth, but that it be still detained in the Body, it Clotteth together and putrefieth, and getteth unto it self a very evil, corrupt, and Malignant Nature, causeth a Gangreen, and exciteth most grievous Symptoms, and at length bringeth even death it self upon the party. And indeed this danger is most grievous and formidable in the Arteries, when the Blood and vital spirits being poured forth the powers of the Body are dejected, and the mans life endangered; neither can the Arteries be easily brought to close, by Reason of their continual motion, and hard substance. And these are the Wounds that (as *Hippocrates* rightly saith) are Mortal. Of which notwithstanding (as I told you before) some are simply or altogether Mortal: which *Prosper Farinaceus* (*Tit. de Homicidis, Quest.* 125. *Part* 3.) defineth, that they are such that require not the Care and advice of Physitians, but are such of which the Wounded person dyeth, that is, by Reason of which (although they be Cured by all the Art and industry of the most skilful Physician,) yet nevertheless the Wounded person instantly dieth thereof. And others of them are not altogether Mortal, and certain in their causing of death; which the same *Prosper Farinacius* defineth to be such, of which the Wounded party dieth not suddenly; and of which sometimes he dieth not at all.

But what Wounds of the latter sort are Mortal, that is, of which although some are now and then cured, and recover their perfect health and strength, yet nevertheless this or that particular person may truly be said to have died of them; will indeed plainly appear from what we said before touching the Mortal Wounds of each single and particular part. And yet nevertheless this is likewise to be added; that we are especially to judg by the Event, whether any such Wound be actually Mortal, or not. For although some strong and lusty Boor, or a Man otherwise exactly sound and healthful shall recover of some such wound; yet Nevertheless it will not necessarily follow, that therefore an old person, a Child, a Woman, or any other that is but of a weak constitution, must recover of the like wound; but albeit the former of these was cured of the like wound, yet this latter may necessarily die of the same. But now whether or no such dangerous Wounds be Mortal in this or that particular person, *Nicolaus Boerius* (in his 323. *Decision, Num.* 11.) teacheth us how we may discover it, by six Conjectures. The first whereof is, the shortness of the time; to wit, if the sick person die very suddenly after the Wound: of which space of time, (albeit there be very many opinions touching it) yet notwithstanding he saith that the principal is this, if the wounded person shall die within three daies after the wound received. But yet however there are some that extend this space of time unto the fifth, or even also unto the eighth day. But others notwithstanding extend this term even unto the eighth month, or a whole year; and this seemeth unto me most probable. And unto this space of time the Mosaical Law (*Exod. Chap.* 21.) seemeth to have respect. The Second Conjecture is, the persevering of the vomiting, and feaver, and other Symptoms that from the very first signifyed and threatened death. And this is a right Conjecture, and according to the Opinion of all Physitians, yea even of *Galen*, and *Hippocrates* himself. For those great and mortal Wounds have their Decretory and Critical daies, like as Acute Diseases have; as *Hippocrates* tels us (2 *Prorrhet.*) in the which good or evil Symptoms are wont to happen. And therefore, if grievous Symp-

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toms (such as are Convulsions, Vomitings, sobbings, Dotages, Syncopes, and the like; which otherwhiles also are wont to presage Death in such as are wounded) presently and even from the very first invade the wounded person; or else appear upon him on the Critical day, and after continually persevere, they then signifie, that they were necessarily brought upon the Party by the Wound, and therefore that the Wound is altogether mortal. The third Conjecture is, the breadth and depth of the Wound. For a Wound that is very great and dangerous in it self may yet although it be great, yet not be dangerous, if by it no Noble part be hurt. The fourth Conjecture is, the quality of the instrument with which the Wound is given, and by which the person inflicting the Wound is convinced that he had a will and purpose to kil the party Wounded. But this conjecture concerneth rather the Court of Justice, then the Colledg of Physitians; who inquire not so much after the will and intention of the person wounding, as simply and solely after the quality of the Wound it self. The fifth and sixth, is, the Continual pain, from whence the Convulsion is brought upon the wounded person. But these conjectures belong unto the Second. And thus, whether or no any one die of a dangerous Wound, and of that kind of them which almost alwaies are Mortal, the Physitian out of those six aforesaid Conjectures, maketh use of two of them especially, whereby he Concludeth that that wound (touching which the inquiry is made) was in it self Mortal and deadly. First, from the shortness of the time that the wounded party lived after his Wound. And then next of all, from the State and Condition of the wounded person, who alwaies (after his Wound) falleth from bad to worse, until his Death; and those grievous and deadly Symptoms, which either presently, or on the Critical day, followed upon the wound, and continually afflicted the sick wounded person. And unto the two former we may not unfitly add likewise a third; to wit, if nothing hath been either committed, or omitted, that might render the Wound Mortal. For from these we may Collect, both that the Condition of the Wound was such, that it might bring death unto the Party; and that the wounded person had such a disposition that was not able to master the Wound. And these in all the aforesaid particular parts are those Wounds that are deservedly to be accounted Mortal.

As for the wounds of the rest of the parts, *Hippocrates* rightly pronounceth them not mortal; & indeed experience teacheth us, that sometimes the greatest and most dangerous wounds have been cured; of which there are divers Histories recited by *Valleriola*, in his fourth Book, *Observat.* 10. And there are every where the like extant, in the observat. of *Guilhel. Fabricius*, and the writings of other Physitians. But yet notwithstanding it oftentimes so happeneth that those very wounds of which some have recovered have proved mortal unto some others; and that very many also die of most sleight and inconsiderable wounds. And *Hippocrates* (*in* 2. *Prorrhet.*) writeth, that a man may chance to die of any kind of wounds. Of which we meet with examples almost in every Author. Touching the Child of *Philias*, *Hippocrates* (*in the seventh Book of his epidem.*) writeth, that he died of only the making bare of the forehead bone, a feaver supervening for one day, and a certain wan leaden color contracted in the sad bone. And the same *Hippocrates* likewise relateth that the Child of one *Theodorus*, upon the making bare of a bone, (almost of no moment) died the 23. day after. And that a certain person, Master of a great ship, having hurt and bruised his fore-finger on the right hand, and his mouth, with an Anchor, (an inflammation and convulsion supervening) on the thirteenth day following died thereof. And that *Telephanes* also the son of *Harpalus* by his free woman received a blow in the great toe of one of his feet; upon which an inflammation, & a vehement pain followed; which remitting, the sick person fell into a convulsion, and died the third day. And so *Pliny* writeth (*in the seventh Book of his Natur. Hist. Chapt* 53.) That *Æmilius Lepidus*, Crushing but his thumb against the bedpost, breathed his last. And that *Caius Aufidius* going into the Senate house, only hurting his foot, died of the same ere he could be carried home to his own house. *Petrus Forestus* (*in the sixth Book of his Chirurgical observat. Observat.* 50.) reporteth that a certain Consul (*Alcmarianus* by name) washing his feet as he was wont to do and endeavoring to cut and pare away the thick Callous skin in the sole of his foot, wounded himself, and that a spasm following upon it, he died immediatly. And oftentimes likewise a Gangreen followeth upon the wounds, and make them deadly. And so *Petrus Forestus* (*in the sixth Book of his Chirurgic. observations, Obser.* 49.) telleth us of a certain person that hurt his Leg by hitting of it against something that was hard, and that upon this bruise and wound of his Leg a Gangrene soon after following took his life from him. And *Guilhel Fabricius* (*in the fifth Cent. of his observat.*

observat. Obser. 2.) mentioneth two examples. One of a certain Labourour, who prickt his foot with a thorn; and the other of a woman that with a thorn likewise wounded the very tip of her right forefinger; both which upon the supervening of a Gangrene died. And *Johannes Matthæus* (*in his Physick Quæst, quæst.* 27.) writeth that at *Freudenberg*, a town of the Dominion of Nassaw, receiving but a sleight wound in one of his shoulders, died thereof. And that another in the County of *Oldenburg*, being but very sleightly wounded with a knife in the middle of his Thigh, died immediatly. And that at *Lemgovia* a certain Citizens son, being but sleightly hurt in his Arm by the sword of a Student, (Contrary unto the expectation of all that saw him) died within one hour after. And *Horatius Augenius* (*in the first Tome of his Epist. Book* 9. *Epist.* 2.) relateth very many histories of them that have perished upon sleight and inconsiderable wounds. And examples to confirm this truth we very frequently meet with in the reading of Authors, and more especially those before mentioned. Now this happeneth for divers Causes, which *Hippocrates* likewise (*in* 2. *Prorrhet.*) toucheth upon in these words. *Whosoever* (*saith he*) *would know, concerning wounds, in what manner they shal end, each of them Particularly; in the first place he ought indeed to make a narrow search & strict inquiry into the several kinds of men, which of them are better able to bear out a wound, and which of them are worse able to undergo the same. He ought moreover to know the several ages in which every particular is difficult to be cured; and to be wel acquainted likewise with the several parts and places in all kind of bodyes, how far forth they differ each from other. He ought also to know even these other things that happen in each of them, of what nature and quality they are, and whether they be good, or evil. For if any one shall know and wel understand all these things, he may indeed then likewise know the several events of each particular wound. But he that shall be ignorant of these things can never know what shall be the ends and events of Wounds. I shall reckon them up in this order following.*

Wounds Curable from what causes they are made Mortal.

For First of all, if the Sword, dart, (or whatsoever it be that inflicteth the Wound) be poysoned, a Wound then that seemeth but sleight in it self may yet bring death.

Secondly, The *Idæa of Men* (as *Hippocrates* speaketh) ought heedfully to be attended; for such as are of a Robust strong body, and sound, these likewise bear and undergoe the most grievous Wounds; and they are oftentimes cured of them without any great adoe: and although that many times very grievous Symptoms may supervene, insomuch that you would judg them even ready to die; yet notwithstanding beyond all hope and expectation they escape, and recover again. And hitherto appertaineth the vitious disposition of the body, and the present Cacochymy. For if any Wound shall befall unto such a like Body, Nature being irritated and stirred up is wont to thrust forth those vitious humors unto the Wound; whereupon other diseases and symptoms happening, that wound which in a found and pure body was Curable, here becometh Mortal; concerning which *Galen* thus speaketh (*in his sixth Book of the Places affected, Chapt.* 2.) suppose, saith he that one came unto us that had only his skin pricked with a Needle; this Man (if he be one whose wounds are wont to be easily healed) although without any medicament administred, with his Member naked and bare, you send him to his accustomed labour and imployment, will yet take no hurt, nor feel no evil: whereas those whose Wounds are not cured without much difficulty, and that are either Plethorical, or oppressed with vitious Juyces; these in the first place feel indeed a certain pain in the Wound; and afterward a part thereof will be infested both with a beating pulse, as also with a *Phlegmone*: and it is found, that of such like smal and sleight wounds oftentimes Convulsions, inflammations, a Gangrene, yea death it self hath followed.

Thirdly, The Age is wel to be considered; in regard of which also there may be a very various Event of Wounds. For those Wounds that are grievous and difficult, yea Mortal, in an old man or a Child, these in a man that is young and strong, are not mortal yea are somtimes accounted very slight & inconsiderable.

Fourthly, A Wound that otherwise is curable may yet become Mortal, by reason that either the Surgeon is wanting; or if he come he chance to prove either negligent, or unskilful: and so by reason of the hemorrhage (in the want of a Chirurgeon) whose part it was to stanch and stop it by ligatures, and otherwise, a man may often run a great hazard of his life, although the wound were not otherwise Mortal. And so, if the Wounds of the brain, of the Nerves, of the Joynts, be unskilfully and negligently handled, (an inflammation, Convulsion, Gangrene, and the like evils befalling the Party) the man may miscarry and perish, notwithstanding that the Wound (had it been rightly handled) were in it self Curable.

Fifthly, Sometimes there happen grievous symptoms so suddenly that although both the Physitian and the Chirurgeon bestir themselves

selves with al possible diligence, before these can be calmed and quieted, other diseases and symptoms happen, by which the man is quite destroyed. And therefore oftentimes the very pain in the part wounded (it being of a very exquisite sense) causeth an afflux of humors, the afflux of humors an inflammation, the inflammation a Fever, a Gangrene, and then death. And this indeed happeneth the more easily, if the wound be in a part that is in it self indeed ignoble, but yet such as can very easily draw a part that is Noble into a consent with it.

Sixthly, Both the Constitution of the Air, and the propriety of the place, have here a peculiar power. So the Wounds in the Head that in many (yea the most) places are not Mortal, in other places are Mortal; which yet nevertheless some there are that reckon them up otherwise. *Vidus Vidius* (*in his sixth Book of the Cure of diseases Chap.* 10. *Page* 249.) writeth, that at *Florence* the Wounds of the head are Mortal to most men; and he ascribeth the cause unto the cold thin Air; but that at *Pisa* and *Lions* very few die of them, in regard the Air is there thicker and warmer. *Amatus Lusitanus* (*in his sixth Cent. Curat.* 100.) Writeth that at *Florence* and *Bononia* the Wounds of the head are extremely dangerous, but not so at *Ragusum*. And *Ambrosius Paræus* testifieth, that wounds of the head are far more difficult to cure at *Paris*, then they are at *Avignion*.

Seventhly, An ill course of Diet may render those wounds deadly that in themselves are not very dangerous: to wit, if the wounded party either eat meats of an ill Juice, be much moved with anger, terrified with fear, Laugh immoderately, and use venery. Examples of this truth, as we meet with them in others, so especially *Guilhem. Fabricius* (*in the first Cent. of his observat, Obser.* 22. *and in his* 5 *Cent. Observ.* 75. and in the 1 *Cent. of his Epist. n.* 1.) reciteth certain of them; as they are there to be seen.

And unto this kind of cause, and in special to a sudden fear and affrightment, or vehement wrath, those wounds are to be referred, that being in themselves but sleight & scarcely considerable, yet notwithstanding many have been known to die of them within the space of a very few hours. For although that the Nerves being pricked and a Convulsion excited, a man may suddenly die; yet nevertheless, in regard that in these there is happening neither any Convulsion, nor yet any other such like grievous symptom appearing; it is therefore credible, that they died by reason of the vehemency of the Passions of Wrath and fear; in regard that these Affects of the Minde have in them a very great power of affecting the Body. Of which thing we have every where examples extant. *Suidas* writeth, that a certain person naturally timerous and fearful, hearing but the bare report of *Hercules* his coming hid himself for fear in a private place; from whence now and then looking forth, and at length seeing *Hercules* by chance passing by, he fell down dead with fear. And so *Julia* the Wife of *Pompey* died suddenly, upon the sight only of her husbands Garment spotted with blood. And as *Plutarch* testifieth, *Lentulus* also hearing unexpectedly of the death of *Pompey* fel down dead suddenly. And some there are that upon the sight of their own blood in venesection, or when they have received any Wound have presently swounded and sunk away. And *Manlius* (in his *Common places, Sub.* 5. *Præcept.*) relateth this history. *A Fool or Natural* (*saith he*) *for some fault by him committed was brought forth unto a pretended and feigned, but not really intended punishment; as if he should have been beheaded. The Headsman cometh, and shews him the sword indeed, thereby only to terrify and feare him, and withal lightly striketh him on the neck with a little wand, and thereby makes the Man* (*fearful and faint-hearted fool as he was*) *to fall down dead, to the admiration and astonishment of al the Beholders.* And *Johannes Matthæus*, (in his *Physical Quest. Quest.* 27.) *telleth us this story. When* (*saith he*) *in the Court of the most illustrious Prince* Ernestus Fredericus Marquess of Bada, *his Highnesses Chief Gentleman of his Chamber* Johan. Beckber *a Plethorick young man, was but lightly touched in his lower eyelid with a blunt-pointed sword* (*such as they were wont altogether to exercise themselves with in their fencing schools*) *from the hand of a young beardless youth, possessed with rage and indignation, and taking it most heynously thus to be foyld by a boy, and his own scholar, fell suddenly into a most grievous Epileptick Convulsion, which in the space of four or five hours ended his life.* And I my self also remember a certain Student (stout hearted enough otherwise) Who being by a Chirurgeon to be let blood (in my presence, and at my command) as the Surgeon was about according to the custom to bind his Arm, and began but to move his Instrument toward the vein, he fainted away, and fell from the seat wherein he was sitting, before ever the Lancet was put neer unto his Arm, whenas Nevertheless he had neither fever, nor any other Disease that might any waies cause and occasion this swounding of his.

Eightly, and Lastly, an Inflammation following upon a Wound may render that Wound Mortal, if it be internal. For indeed an Inflammation doth not necessarily accompany Wounds: yet notwithstanding because

cause that in internal Wounds those Medicaments cannot possibly be administred that were wont to be applied in external, if any internal part (especially if it be more Nervous, and of an exquisite sense) shall chance to be wounded, then a pain is excited, and thereupon an afflux of Humors, and from thence an Inflammation, a feaver, a Gangrene, and other Evils do arise, that destroy the Wounded person within a very few daies. And from hence it is, that the Vulgar do likewise in Wounds observe the seventh and the nineth day; because that within these daies those Symptoms are wont to supervene, and in these daies to bring the greatest danger unto the sick Party.

Some there are that add yet another Cause, to wit, the influence of the Stars. And so *Franciscus Vallesius* (in *his Comment. upon the* 95. *Text. B.* 4. of *Hippocr. his Epidem.*) saith that the Malignant Aspect of the Stars and Constellations is the Cause why light and very sleight Wounds are oftentimes likewise rendered Mortal. And the very same *Quercetan* also tels us (in his *Third Chap. Touching Wounds made by Guns*) and that for this very Cause the Wounds of the Head are for the most part wont to be Mortal, at *Ferraria*, and *Florence*. But this Cause is not to be admitted of; neither can there any Reason be easily rendered, why at *Ferraria* the wounds of the Head should be mortal, and not so in the neer neighbouring *Rhodigium*, or *Bononia*.

And from these Fundamentals no doubt it is that Civilians likewise take upon them to pronounce what Wounds are of themselves and in their own Nature Mortal, and what not. *Nicolaus Boerius* (in the *place alleadged*, N. 18.) propoundeth six Conjectures, from which it may be Collected, that the Wound was not Mortal of it self, but that it was made such by Reason of some accident happening thereupon. The first is, if the Wounded person died not until a longer time after then wounded persons are wont precisely to prolong their Lives. The Second is this, if there were present no dangerous Symptoms in the beginning of the Wound; or if there were any present, and remained for a while, the sick person notwithstanding was not much the worse for them, but that he was able to perform all kind of Actions in such a manner as they are not able to do that are mortally wounded. For if he shall appear to be in a fair way of Recovery, and then afterward die, it is to be beleeved that he died upon some other Cause, and not from his Wound. All which notwithstanding are to be understood only of a Wound that is not of it self Mortal. The third Conjecture is, if the sick person (in the Course of his life) were not so ordered as wounded persons ought to be; but that he exposed himself unto the cold Air, addicted himself unto excessive drinking, were often distempered with passions of the mind, immoderate Anger, frequent affrightments; and overmuch addicted to Venery. The fourth, if the Physitians were of opinion, and that they adjudged the Wound not mortal; who as men experienced in their Art ought to be beleeved. The fifth is, if the wounded person had no Physitian with him; or if any were sent for unto him, he was one altogether ignorant and unskilful; which is al one as if he had had none at all. Which yet nevertheless (as hath been said) is only to be understood of a Wound not simply mortal in it self. For if a Wound be in it self mortal, albeit there were no Physician sent for, yet nevertheless we are not thence to collect, that the wounded person might have been cured. The sixth and last Conjecture is, if the wounded person be of a strong Nature. For in this Case, if due care be taken in the preserving of the said Natural strength and vigour, the sick person very seldom miscarrieth. But if the Wound being not mortal, the wounded person die, and that in a short time, we ought to collect that he died not of his wound, but that he died from some other Cause, as we said before.

And this is the Judgment of all Physitians in general touching Wounds, both mortal, and not mortal. But yet there ariseth another Question among the civil Lawyers, to wit, whether the person that inflicteth the Wound may be found guilty, and condemned of Homicide. For these do not only (as Physitians) weigh and consider the quality and Nature of the wound, but the minde and intention also of the party wounding, and other Circumstances likewise; touching which we may see more in the Books of these Civilians.

The Rest of the Prognosticks.

Now although that out of what hath hitherto been said may easily appear what is to be foreknown and foretold touching the event of wounds; yet nevertheless we think it not amiss here to add somwhat more as touching the premises. For although that other Wounds (besides those we have already spoken of) do not indeed suddenly destroy and kil the person; yet nevertheless some of them are far more dangerous then other; and even of these some are more easie, some more difficult to Cure. And this in the first place is to be learnt from the very substance of the part. For the fleshy parts of all other are most ea-

fitly brought together and fodered again; the reſt, as the Veins, Arteries, Nerves, Tendons, and Membranes, with more difficulty. They may be united, and made to grow together again, but it will be more ſlowly. *Galen* (in his 1. *B. of the Seed, and* 13. *Chap.*) tels us, that himſelf ſaw the Veins in the Head (and thoſe both many of them, and great ones alſo) grow again; and (in his 5. *B. of the Meth. of Phyſick Chap.* 7.) that he ſaw an Artery alſo united. Secondly, from the Action and Uſe of the part. For the more Noble the part is in regard of its more neceſſary Uſe, and the Action that it performeth for the good of the whole Body, ſo much the more dangerous are the Wounds of that part. And thoſe parts likewiſe that are in continual motion will not be brought to grow together again but with much difficulty. And the more exquiſite likewiſe the ſenſe of the part wounded is, the more eaſily upon its being Wounded there happeneth unto it a pain, an Inflammation, a Deliry, a Convulſion, and other Symptoms. Thirdly, From the very greatneſs of the Wound. And Fourthly, From thoſe things that uſually happen and befal the Wound. To wit,

Prognoſtick. 1. The more Noble the part affected is, or which may likewiſe draw a more Noble part into Conſent with it, by ſo much the more dangerous is the Wound.

2. Thoſe Wounds that are in the muſcles, far from the Joynts, and the Temples, are more eaſily Cured then thoſe that are in the Nerves, Tendons, Membranous parts, and the Joynts. For the wounds of the Nerves and of the nervous parts are for the moſt part dangerous; in regard that by Reaſon of the pain, and inflammations, a Convulſion and other grievous Symptoms do eaſily happen: and therefore they require a very expert and diligent Chirurgeon.

3. All the Wounds of the internal parts are more dangerous then the Wounds of the external parts.

4. Great Wounds are more dangerous then ſmal ones, all things elſe being anſwerable.

5. *Moreover* (ſaith *Celſus*, in his 5. *B* and 26. *Chap.*) *that which may much conduce hereunto, is, the Age, and the Body, and the order and Courſe of life, and the time of the yeer: for ſooner is Cured a Child, Youth, or young man; then one that is Ancient, and in years: and one that is of a ſtrong Conſtitution is more eaſily and ſooner Cured then he that is of a weak and infirm Body; and one that is not over fat, nor over lean ſooner then if he were one of theſe; and he that is of an intire and ſound habit, then that man that hath an unſound and Corrupt habit of Body. And ſooner likewiſe is that perſon to be Cured that is given to exerciſe, then the ſlothful and ſluggiſh perſon; the ſober and temperate, then one addicted to Wine and Venery.*

6. Wounds are more eaſily Cured in the ſpring time, then in the Winter, or the hot Summer.

7. That Wound likewiſe that hath a Contuſion Joyned with it, is the more dangerous. And therefore it is of the two better to be wounded with a ſharp-pointed or ſharp edged, then with a blunt and dull Weapon.

8. Thoſe Wounds are moſt ſafe, and moſt eaſie to Cure, that are made in a ſtraight and direct line; but thoſe with more difficulty, that are oblique; and thoſe moſt difficultly of all that are round and orbicular.

9. If a Nerve, or a Vein, or an Artery, ſhall be wholly Cut, there is leſs danger impending, then if it be cut but only in part: alwaies provided, that they are none of the more notable Veins and Arteries, and Scituate in the deeper parts of the Body. For if a Nerve be wholly cut aſſunder, there is then no danger of a Convulſion; which we may well fear is night at hand if the Nerve be cut but only in part. And ſo, if a principal Vein and Artery be wholly Cut; the danger of the Hemorrhage is then wholly taken away, when the Veſſel is Contracted, and drawn together: but if a Vein or an Artery be only wounded, and not wholly cut aſſunder, very dangerous Hemorrhages do their oftentimes ariſe. And yet nevertheleſs, if it be one of the moſt Notable and Obſervable either of the Veins or Arteries that is cut aſſunder, then that part unto which this befalleth is deprived of its wonted Native and neceſſary heat; and is ſomtimes likewiſe taken with an Atrophy.

10. Thoſe wounds that have paſſed beyond the laſt and utmoſt term of Acute Diſeaſes, and eſpecially the fourteth day, are not in themſelves Mortal: but if the ſick perſon die, this may proceed either from an ill diſpoſition of the Body, or elſe by Reaſon of Errors committed in the Diet of the ſick perſon, or the Phyſitians Errors in the curing thereof. Yet nevertheleſs ſuch like wounds are not Cured without much difficulty; in regard that they indicate, that there is preſent ſome grievous Cauſe, which hindereth the Conglutination of the wound.

11. That wound is alwaies evil, by which there is ſomthing cut off, and by which the fleſh that is cut off from one part hangeth upon ſome other.

12. *Such as together with their Ulcers are troubled*

troubled with Conspicuous and apparent Tumors, these are not subject unto any dangerous Convulsion, or Madness: but those in whom they presently vanish and disappear, if this indeed be done in the hinder part, then Convulsions and Cramps follow: but if in the forepart, then there happeneth Madness, an Acute pain of the side, an Empyema, and Dysentery; if the Tumors be more red then ordinary, in the 5. of the Aphor. Aph. 65. And ibid. Aphor. 66. If the Wounds being great, and depraved, there appear no Tumor, this betokeneth much evil; which Celsus *(in his 5. B. and 26. Chap.) thus rendereth. But for a Wound overmuch to swel up is somwhat dangerous; but not at all to swel up is far more dangerous, Yea most of all perillous. The former is an evidence of a great Inflammation; and the latter a token of a dead and mortified Body.*

13. That an Inflammation should supervene upon a great Wound is no wonder at all; and therefore it ought not in the least to terrifie us, if it do not long continue. But for an Inflammation to follow upon a smal wound, and for it long to Continue, this indeed is very dangerous, being such as is wont to excite a Convulsion, and Deliries, or Dotings.

14. *When the fifth day is now come, how great the Inflamnation is like to be, it will then shew it self. On which said day the Wound being again uncovered, the color thereof ought well to be considered. Which if it be Pale and Wan, Leaden-colored, of a various colour, or black, we are then to know for a truth, that this wound is evil and dangerous; and this whensoever we well consider it, cannot much terrifie and affrighten us;* Cornel. Celsus Lib. 5. *Chap.* 26.

15. *A Convulsion in a Wound is very pernitious;* Hippocrat. Sect. 5. Aphorism. 2.

16. A Vomiting also of Choler that is neither voluntary, nor yet accustomed unto, even presently so soon as ever a man is wounded, or while the Inflammation remaineth, this is an ill sign; because it betokeneth that the Nervous parts are wounded.

17. If the wound in the Arm, Hand, or other part, be so great, that by Reason of the Veins and Arteries cut asunder it can no longer possibly receive any influx from the Liver and the heart, the extream part then dieth; and therefore lest that the Gangrene should be communicated unto the sound part it is maturely even with all speed to be cut off.

18. Those wounds that happen unto Cachectical and Hydropical persons are very hardly Cured; because that (as *Hippocrates* speaks of *Ulcers*) *Whatsoever is dry cometh neerer unto that that is sound; and whatsoever is moist approacheth very neer unto that that is vitiated.*

19. The greater the Wound is, the more time (all things else being answerable) is required for the curing thereof; and the less it is, the less time it requireth for its Cure; so that some wounds indeed are cured in twenty four hours time, but others require the space of many daies for their perfect Cure.

20. That wound that is not purged and cleansed but with much difficulty is likewise hard to Cure, and slow in the Curing; in regard that that which is an impediment unto the Curing thereof is not taken away without much difficulty.

21. A wound in that part that is apt and ready to receive the influx of the Humors is very hardly Cured.

22. All wounds that have any other affects complicated and interwoven with them, are the more difficultly cured. For the more the Affects are, the more Nature is hurt; and it is easier for her to take away and correct one only affect, then many; and in very deed, the more the affect that is conjoyned doth hurt the temperament of the part, so much the more difficult will the wound be to Cure.

23. All things extraneous, and that coming from without stick fast in the wound, if at the very first they cannot be drawn forth, they much retard the Cure.

24. Wounds have likewise their Critical daies; touching which *Hippocrat.* (in *Coacis Prænot.*) saith; *That for a feave, (in the wounds of the Head) to begin the fourth day, or the seventh, or the eleventh, is very fatal and dangerous: but that for the most part it is to be Judged of if it begin on the fourth day of the wound, and so continue unto the eleventh; or that it begin on the seventh day, & continue unto the fourteenth or seventeenth; or if it begin on the eleventh, and continue unto the twentieth.* And in his *B. of the Wounds of the Head*, he saith, that when any Error is committed in the Cure of a wound, that then for the most part (if it be in the winter) a Feaver cometh upon it before the fourteenth day; but if it be in the Summer, after the seventh day: and there he also asserteth, that some perish either (in the Summer time) before the seventh or (in the winter) before the fourteenth. And in his 4. *B. de Popular.* he there relateth, that unto the Son of *Metrophantus* being wounded in his Head there happened unto him a Feaver on the twelfth day, and that he died about the twenty fourth day; And in the 5. *Popular.* he reporteth that *Antonomius* of a wound in his head died the sixteenth day;

day; and a servant Maid in *Omylum* on the fourteenth day, unto whom a Feaver had befaln on the eighth day: and that the Daughter of *Nereus* by a friend of hers being in sport and merriment struck on the forepart of her Head, at that very time affected with the *Vertigo*, presently became breathless; and as soon as she was come home she was forthwith taken with a vehement Feaver, and with a pain in her head, and a redness about her face; and that she died on the nineth day, when on the seventh day about her right ear there proceeded forth a great quantity (more then a Porringer ful) of filthy stinking *Pus* or Mattier, being somwhat red, but very offensive. And that the Son of *Phile* after a wound in his head had a Feaver surprizing him on the ninth day, and upon this he soon after dyed. And that *Aristippus* receiving a violent and grievous blow (by the stroke of an Arrow) upon the upper part of his Belly, died in seven daies after. And all along in *Hippocrates* we shall find, that he also in wounds did observe the Critical daies. The truth is that wounds (as wounds) have no Critical daies; since that a wound is a Disease without matter. But as there may happen unto it some certain matter (that ought to be Concocted) or some kind of disturbance of the Humors upon occasion of the wound, in this regard it may likewise have some Crisis. For even Nature her self, upon some certain fixed and set daies, both concocteth that that ought to be concocted, and calmeth the disturbance of the Humors. And therefore, whensoever on the Critical daies there is no change nor alteration for the worse, but that all things proceed in a right manner, and that the Symptoms which before were present are now quieted and Calmed, it then affords great hopes of a happy Cure to ensue. But if (on the Contrary) in these daies there supervene any evil, as pain, Inflammation, or Feaver; or if those Symptoms that were before present are not lessened, but are rather become more intense and greater then before, it then betokeneth either Death, or a very difficult Cure. And it is altogether a very rare thing, that any such kind of motion in wounds ever bode any good unto the party; since that it declareth that Nature is not able to quiet and Calm that Motion of the Humors that happeneth in a wound; but that being stird up and set on work she endeavoureth the expulsion of these Humors either unto the wounded part, or some other principal part. And therefore, when any such motion as this is taken notice of in a wound, rather much evil then any good at all is from thence to be presaged. And therefore it will be to very good purpose to observe those Critical daies in wounds; that so by them we may come to know the useful actions of Nature, and that so we may not hinder them. We are likewise on these daies to abstain from all those things that may excite any motion of the Humors on the said Critical daies.

Chap. 4. *Of the Cure of Wounds, and First of all, touching the Indications.*

The first and Common indication of the solution of unity is the uniting thereof; or, unity dissolved sheweth, that the parts that are separated and disjoyned should again be united and brought together, so far forth indeed as the wound is a simple affect. But if there be conjoyned other Affects, whether they be causes, or diseases, or symptoms, there are then so many indications given us as those several things are that are conjoyned with the Wound, and so constitute a compound Affect; and these may be very many For somtimes the weapon or some other body sticketh in the Wound; which because that it is extraneous it hath the nature of a cause; and (as those things that are from internal causes, and in their whol kind preternatural) indicateth its removal.

If there be any of the substance of the flesh lost, there is then a double indication given; to wit, that which is divided is again to be united; and that which is wanting, again to be renewed. If the flesh and the skin be bruised, that that is bruised is to be converted into *Pus*, that so it may separate and fall off. And so likewise of al other affects that are conjoined with the Wound, the case is one and the same.

Now we will first of all treat of a simple Wound, and the solution of continuity that is caused by a weapon; upon which there hath as yet followed no other evil: but yet because that somtimes the Weapon, or some other strange body inflicted with the wound sticketh therein, we wil therefore together and at once treat of the removal of them.

But now, (as we said before) the common indication of a simple wound is union, as *Galen* teacheth us in his *Art. Medic. Chap.* 90. And (as the same *Galen* hath it in his *third Book of the Meth. of Physick, Chapt.* 4.) a simple Wound only requireth agglutination. Now this Agglutination and union is the work of Nature alone; and by her operation only the wounded parts, as likewise those parts that are broken and disjoyned, do again grow together, and are conglutinated. But then since that there is required for this purpose a certain medium, and a glew as it were; nature for this purpose maketh use

of

of that very matter by which the parts are nourished, to wit, the blood. For this blood being attracted unto the part for nutrition, and sticking in the pores of the sides and the lips of the wound, is converted into a substance like unto the wounded part, to wit, flesh; and so by the benefit thereof, what was disjoined now groweth together again, and so of two becometh one. And this in the flesh the *Sarcopoietick* faculty performeth; in the skin, the cutifique or skin-breeding faculty: and so in every part, Nature generateth a Medium of the same kind, for the Agglutinating of that which was disjoyned. And this inded albeit that it be solely Natures work; yet the Physitian in the furtherance of this work is a Servant unto Nature; and the truth is, that unless the Physitian strike in for Natures assistance, she is in many things frustrated of her end; neither can she effect the intended Conglutination.

But now those things that in this case are to be done by the Physitian, are reduced by *Galen* (in *Art. Medic. Ch.* 90) unto four heads. *Nature her self (saith he) causeth to unite and grow together again those things that stood at distance one from the other, and she it is that restoreth the pristine Unity: but now it is our part and work actually to apply and put together the extreams of the distant parts, and being thus brought together into one, so to keep and preserve them; and thirdly to beware of this, that nothing fall into the Lips of the wound; and fourthly, our work it is to preserve safe and unhurt the substance it self of the part.* And so in the Cure of Wounds, there are especially four offices belonging to the Physitian specified by *Galen* in the *place alleadged*. First of all, the Physitian is to see and take care, that nothing fal into the part affected, which may hinder the Conglutination. Secondly, That the Extreams in Unity dissolved may again be rightly conjoyned, and put together in a due and fit manner the one to the other; and the extreams thus joyned together are so to be kept, until Nature hath done her work. Thirdly, That so the temperament and the innate heat of the part it self may the better be preserved, he is during the time of Agglutination to afford unto Nature all the necessary help and assistance that he can by the best of his skill and diligence. Unto which we may not unfitly add a fourth, to wit, that those Symptoms which may, and are wont to supervene, may be prevented and corrected, and all those things taken away which may be any the least impediment to Nature in the Conglutinating of the Wound.

But now in regard that there may be a very great difference in the solution of Unity, these Scopes are not alwaies to be performed alike in one and the same manner in all parts. And first of all, for what concerneth the wounds we are now treating of, if there be any thing extraneous (as Clods of Blood, or Haires, or any thing of the Nature of any sort of Weapons, or smal pieces of bones, or any thing else whatsoever from without) shall chance to stick in the Wound, that is to be taken forth, and extracted. For they cannot possibly become one, between which somthing lieth that is of a different kind. And indeed we are not only to draw forth of the wound (at the very first) all things that are extraneous, but we must likewise afterward take great Care, lest that any thing from without fal into the wound.

When once all extraneous things (if any such there were) are drawn forth, the lips of the Wound are then to be brought together, and joyned close the one to the other; the which how it ought to be performed, we shal by and by shew you.

The parts that stood at distance being thus Conjoyned, all the rest of the work (to wit, that they may be united, and grow together in one,) is the work of Nature alone. For it is she only that Conglutinateth these parts when they are disjoyned. But seeing that Nature in this Agglutination maketh use both of the temper of the part, and the innate heat thereof; we must therefore do our endeavour that the temper and innate heat of the part may be preserved, or if it hath been by any means weakned, that it may be again restored. And seeing likewise that the matter of the flesh (by which the parts are Conjoyned) is the Blood; we must therefore take especial care, and use the very utmost of our endeavours, that the Blood that floweth unto the part affected may not offend either in quantity, or quality. For if the Blood be vitious, it cannot generate good flesh. And again, if there be too great abundance thereof, the flesh then becometh over Luxuriant and proud; and there are many Excrements generated: if there be less thereof then is requisite, it doth not then generate and make a supply of sufficient matter. And whereas the wounded part is made much the weaker both by the pain, and by the wound; therefore in the wounded part of necessity there must be produced store of Excrements, and corrupt filthy mattier: and if the *Sanies* and Excrements intervene in the midst of the Lips when they are drawn together; or if that also there shall be any middle place between, which though it be indeed void of filth and Excrements, yet is ful of Air, such a like Ulcer (I say) cannot possibly be Conglutinated by the sole Conjunction of the disjoyned and distant parts; but that it may unite and

grow

grow together again, there is a neceſſity that it be firſt filled up with fleſh. And therefore in ſuch like caſe as this there wil be need of a ſarcotick Medicament. And ſo, in the performing of the cure of Wounds, our firſt office and work is,

1. To endeavor, that nothing extraneous and coming from without may ſtick in the wound, and betwixt the Lips thereof; and that nothing be left remaining therein.

2. That the Gaping parts of the wound may be again conjoyned.

3. That being conjoyned they may be ſo kept.

4. That they ſodder and grow together again, each to other.

5. The performing of which ſeeing that it is the work of nature, it is eſpecially requiſite, that the temper and ſtrength of the wounded part be by all manner of means preſerved.

6. That all the ſymptoms, and whatſoever may poſſibly hinder the uniting and Coalition of the part, may be taken away, and removed. And thus, although that a wound, only conſidered as a wound, is one ſimple Affect, and ſeemeth to indicate and require one only uniting; yet nevertheleſs, the very truth is, that there are herein couched very many indications, as before we told you.

Chap. 5. *Of things extraneous, and from without, that are to be taken forth of the Wound.*

IN the firſt place therefore we muſt uſe our endeavour, that there may be nothing extraneous in the wound that may hinder the union and glutination thereof. And therefore firſt of all, the blood is not inſtantly to be ſuppreſſed; and we muſt permit whatſoever we find ſticking in the leſſer veines cut aſſunder freely to flow forth. For ſo by this means there will both a leſs quantity of *Pus* be generated, and all the danger of putrefaction and inflammation be prevented. Which is likewiſe very well known by him who out of ſimple wounds is wont either to extract the blood, by ſucking it forth with his mouth, or to ſqueez it out by the compreſſion of the wounded part with his finger. Moreover, when there are any hayres neer about the wound they are to be ſhaven away, leſt that they fall within the lips of the wound. Thirdly, if ſand or earth, or any ſuch like thing ſtick within the lips of the wound, it is to be cleanſed away with wine. Fourthly, if there ſhal be any Clods of blood in the wound (ſeeing that they may hinder the uniting, excite pain, and putrefying may cauſe a fever) they are therefore to be wiped away with a piece of a ſoft Linen Cloth, or a lock of wool; or if need require, they may likewiſe and muſt be taken forth with an iron inſtrument. In which action notwithſtanding we muſt uſe no manner of violence at the firſt ſetting upon the cure; neither is all the Clotted blood at once to be taken forth, and eſpecially if a Hemorrhage be feared; ſince that the clods of blood may ſtop the orifices of the veins, and the veſſells may grow together under them: but this is to be deferred until the ſecond or third dreſſing; when we have afterward nature her ſelf (which beginneth to expel whatſoever is extraneous) helping and aſſiſting. Fifthly, the little broken bones likewiſe (if any ſuch be in the Wound) are to be taken forth. In the firſt dreſſing nevertheleſs only thoſe things are to be taken forth that are altogether free and looſe, ſo that they may be taken out of the Wound without offering any violence thereunto: but as for ſuch ſmal pieces as yet ſtick faſt unto other bones, in theſe Natures endeavour is to be expected, and ſo it wil ſoon be ſeen whether ſhe intend to unite theſe fragments that are broken with the reſt of the bone, or elſe whether ſhe purpoſe to make a ſeparation. Sixthly, if Glaſs be broken in the wound, it is to be taken forth; and this is alſo to be done, if any other kind of Weapon, or Arms wherewith the wound is inflicted, ſtick in the Wound. But before we aſſay the extraction of the ſaid weapons we are to look and conſider, whether or no the wounded perſon be likely to live after the drawing forth of thoſe things aforeſaid. For if there be no hopes of life remaining, there is no ſuch taking forth of any thing to be attempted, no not of the weapon it ſelf; leſt that the Chirurgeon ſhould be thought to have haſtened on the parties death and leſt the wounded perſon dye under the very hands of the Chirurgeon; which happeneth ſometimes in the wounds of the Heart, of the Brain, (the baſis thereof eſpecially) the *Vena Cava* (or great hollow vein) or the great Artery. For it hath been obſerved, that ſuch wounded perſons though the weapon hath been left in the wound, have yet lived for the ſpace of a whole day; but that upon the drawing forth of the weapon (by reaſon of the Hemorrhage following thereupon) they have inſtantly died. But where there is any hope that the ſick perſon may be recovered of his wound, we ought then to labour that firſt of al the weapon be drawn forth. For the weapons, as likewiſe leaden bullets, although they may ſomtimes ſtick very long in the body: yet notwithſtanding it is a very rare thing, that a

wound

wound should be perfectly cured, the weapon stil secretly abiding in the body.

The drawing forth of the weapons

But now to draw forth the weapons aright is a thing of much difficulty; and this difficulty ariseth especially from the place into which these weapons being thrust into the body have penetrated. And therefore for him that wil attempt rightly to draw out the weapons forth of the body, there are two things mainly necessary; First, wel to consider and mind the substance and nature, the figure, situation, and connexion of each several part of the body: and then Secondly, to know the diversity of the weapons, from their matter, magnitude, and figure: and it is likewise altogether necessary (in the drawing out of the Weapons) to be cautious, that the veins, Arteries, Nerves and tendons be not torn or violated. For (as *Ambrose Parry* saith truly) it would be a thing very shameful, and much unbecoming an Artist, that the hand of the Chirurgeon should do more hurt then the iron weapon. But that the weapons may the more fitly and expeditely be drawn forth, let the wounded person be set in such a posture and figure as he was in when he received his wound. Which if it cannot altogether be done, yet lying along let him so be placed, that he may come as neer as is possible unto that figure.

How many ways the weapons may be drawn forth.

Now the Weapons are taken forth in a twofold manner, either by extraction, or impulsion; that is to say, either the same way that the weapon went in, or else that way that it tendeth. It is extracted the same way that it was thrust in, either without making any section, or else by a section made in the part. For if the weapon hath not pierced very deep, if it hath not passed thorow the great vessells and Nervous places; and if that either right opposite unto it, or the way that it tendeth, it hath bones, veins, arteries, or nerves; and lastly, if there be no great fear of any danger to follow upon a wide opening of the part; then in this case, it may be drawn back the same way by which it pierced into the body, and that without any section at all.

But if there be any danger, and cause to fear lest that the body may be torn, if the weapon be drawn back the same way by the which it entered in; the wound is then to be dilated, either by section, or else even without it; to wit, with that instrument which *Celsus* (*in his fifth Book, and Chap* 7.) calleth *Ypsiloeides*, or else with a Swans bill, or Storks bill, or some other dilating instruments, to the end that the weapon may be drawn forth the more easily. But then, the weapon is to be drawn forth either with the Hands, (if that may conveniently be done, as when it standeth out, and is fastned in the flesh alone:) or else with that instrument they cal *Volsella*, when it sticketh deeper then that we may well lay Hands upon it; or with those other instruments that the Greeks call *Beloulca*; of which sort are the long Cisers that are ful of Teeth, straight, or a little Crooked, broad in their extream part, and likewise round; unto which the Chirurgeons of latter times have given divers names from their several Figures; and they call them Crows Bills, Storks Bills, Ducks Bills, and Goose Bills; several Figures whereof we find extant in *Ambrose Parry* his tenth B. and 18. Chap. and likewise in *Johan. Andreas a Cruce*.

But if the weapons point hath penetrated further then unto the middle part of the Member; and that the space and distance by which the weapon is to be drawn back be greater then that which yet remaineth to be passed through, and that neither Bone, nor Nerve, nor Vein, nor Artery any way hinder it; it will then be more commodious (a Section being made) to drive the weapon forward by that part toward which it tendeth, and so to draw it forth by a wound new made. For in this manner it will be drawn out more easily, and the wound will the sooner be cured, in regard that now the Medicaments may on both sides be applied. But yet nevertheless if the Weapon be too broad, it will not then be expedient to drawn it forth through the other part, lest that we add unto the great Wound it self another likewise as great. And if also the Weapon be thrust in between two bones, the Members lying next unto them are to be widened (according to the usual manner) and drawn several waies, that so the space betwixt the bones may be the looser and wider, for the pulling forth of the Weapon thrust in between them.

But if some smal piece of a Bone, or a Thorn, or Splinter, or any such like, stick in the Wound (that can neither be drawn forth with the hands, nor any instrument,) it is then to be extracted by those Medicaments that have in them a power and virture to draw forth. And for this purpose there are commended (by *Dioscorides*, in his 2 B. and 58. *Chap.*) those things that follow; to wit, the *Heads* of *Lizards*, bruised smal, and imposed thereon; *Water Pimpernel or Brook-Lime, Dittany of Crete, the Roots of round Aristolochy or Birth-wort, Anemony or Wind-*

What Medicaments they are that draw forth those things that stick in a wound.

Wind-flower, the Root of Narcissus, of Gladiol or Cornflagge, and of the Reed, Sagapenum, Galbanum, Ammoniacum, Pitch, Pine-rosin, and the like, administred in the form of an Emplaster.

There is also commended the Emplaster of *Avicen*, that is Compounded of Leaven, Honey, or the Propolis (as they cal it) of Bee-hives, of each half a pound; Bird-Lime three ounces; Ammoniacum two ounces; the oldest Oyl three ounces.

And so is likewise the Unguent of Betony, and the fat of an Hare. Or,

Take *New Wax, one pound*; *Colophony, and yellow Rosin, of each four ounces*; *Ammoniacum, two ounces*; *Bdellium, one ounce*; *the Juyce of Citrons, three ounces*; *the Oyl of Yelks of Eggs, four ounces*; *of the Load-stone, five ounces*: And make an Emplaster according to Art. Or,

Take *Virgins Wax four ounces*; *Turpentine two ounces*; *the Load-stone one ounce and half*, *Hulled Beans, one ounce*; *Harts Fat, half an ounce*; And make an Emplaster according to Art. Or,

Take *Rosin of the Pine-Tree, two ounces*; *dry Pitch, one ounce*; *Ammoniacum, Sagapenum, Gum Elemi, of each half an ounce, Root of round Aristolochy, and of white Dittany, of each one dram and half*; *Cretan Dittany three drams*; *old Oyl, or the Feces of the Oyl of white Lillies as much as will suffice.* And make a Cerot. Or,

Take *Oyl of Olives one pound and half*; *new Wax, one pound*; *let them melt together*; *and then add Litharge of Gold one pound and half*: *then boyl them, after this adding and mingling therewith, of Galbanum and Opopanax, of each one ounce*; *Ammoniacum and Bdellium, of each two ounces*: *Let these Gums be dissolved in Vinegar, and then add of the Root of round Aristolochy, Mastick, Mirrh, Frankincense, and Lapis Calaminaris, of each two ounces*; *and in the Conclusion boyl them all together with a soft and gentle fire, adding thereunto in the latter end of the boyling, Oyl of Baies, and Oyl of Turpentine, of each four ounces*; *and stir them wel together during the boyling*: *then pass them through a Linen Cloath into cold water*; *and then softening all with the Oyl of Camomile or Turpentine*, Make an Emplaster. Or,

Take *Narcissus Onyons, two of them, Reed Root one ounce, Gladiol Root half an ounce, Mullein leaves one handful*; *rotten Doves dung, one ounce*; *wild Cucumber Root, and the Root of Round Aristolochy, and of white Dittany Root, of each three drams*; *Cretan Dittany half an ounce, the meal of the bitter vetch Orobus, a little quantity thereof, Honey as much as will serve the turn.* And make an Emplaster. Or,

Take *Wax, and Turpentine, of each six ounces, Colophony, Ship Pitch, of each one ounce*; *Ceruss, Roman vitriol, of each four ounces, Lap. Hæmatites, or the Blood-stone, and the Load-stone, of each two drams, Mastick, half an ounce*; *Frankincense, Camphire, Mummy, Dragons Blood, of each one ounce*; *Oyl of Juniper one ounce and half*; *Oyl of Eggs six drams, Oyl of Cloves two drams*; *of Saint Johns-wort, half an ounce*; *of Earth-worms an ounce*; And make an Emplaster.

Touching the drawing-forth of the Weapons out of Wounds you may see more in *Cels.* his 7. *B. Ch.* 5. and in *Paulus Ægineta* his 6. *B.* and 38. *Chap.*

But if by no artificial means the Weapon (or whatsoever else it be of any thing Extraneous) cannot be drawn forth of the Wound, the whole business is then to be committed unto Nature; which oftentimes in this kind worketh wonders, as it were; and expelleth those preternatural things that are thrust into the Body, by any waies whatsoever where there is any possibility: of the truth whereof we every where meet with Histories to confirm it. *Hippocrates* (as he tels us, 5. *Epidem.*) in one that had an arrow shot within his Groins, took forth the Head thereof six yeers after. And *Guilhelm. Fabricius* for one that had a knife run into the *Spina Dorsi* or Back-bone, drew it forth two years after; as he telleth us, in his *first Cent. Observat.* 62. The like whereunto (and a thing very Memorable) happened here at *Witteberg*. For a certain Student being wounded with a knife even to the Root of his Nose, and the internal Angle of his right Eye, half of the knife being by violence broken (almost as long as ones Finger) stuck there firmly fixed in the bone: which when neither the Physitian nor Chirurgeon took any Notice of, neither he that had given the wound would be known of any such thing as the breaking of the Knife, the wound was speedily consolidated. It happened notwithstanding, that after a quarter of a year, the sick person felt a certain pain in the upper part of his Palate, before the *Columella*; and afterwards there was an Ulcer opened: and yet nevertheless, neither the sick person himself, nor the Chirurgeon thought any thing of the Knife that lay hid within, but haply they thought that this Ulcer that was opened had its original from the rottenness of the bone wounded. Yet a little after it so happened, that behind the Columella there stuck forth some thing of a black colour, which they thought to be a shiver of the rotten bone. But the sick person coming to me for advice, I commanded the Chirurgeon that with his instrument he should search, to find what it was; who immediatly

discovered

discovered that it was Iron; and so we found that it was the point of the knife that stuck forth. And without question the edge of the Knife by its motion had opened that aforesaid Ulcer before the Columella. But yet nevertheless, although the Chirurgeon attempted the drawing of it forth, (the broader part of the Knife still sticking fast in the bones) the Knife do what he could was not by any means to be drawn forth; but that when al was done the whole business must be committed unto Nature; by whose assistance it happened, that the Knife hung forth every day more then other. At length, when the point of the Knife stuck forth in the Jaws almost the length of a Fingers Joynt, and that the sick person manifestly perceived some sensible motion thereof, (which before he had not done, in regard that by degrees and insensibly it daily conveyed it self downward, which he took no notice of;) he then conceived himself to be in extream Peril, fearing that the Knife by reason of the sharpness of its point should makes its way into the Bowels; and therefore with the Chirurgeon comes running unto me, to ask my advice. But then suddenly the broken piece of Knife being freed and set at liberty by its own motion, and falling more and more downward, the point thereof was laid hold on by the Chirurgeon, and so brought forth; and very little it wanted from falling into the Throat. And whereas (the bone being eaten through) a hole was left in the upper part of the Palate, which was a very great impediment unto him in his speech, (besides fit and convenient Medicaments, to cleanse, and dry much) at length I ordered him a thin plate of Gold, in the form of a shield, which in the back thereof had somthing sticking forth, and round as a Globe; this I caused to be provided for him, and then I ordered a little Spunge to be bound unto it; which said plate by the Spunge being put upon the hole, and there sticking, and shutting the hole, he spake distinctly enough to be understood. Yet notwithstanding the flesh began afterwards to grow and increase in the Lips of the Wound, (although but very slowly) and the hole became somwhat narrower. After I had furnished him with this plate, he departed hence: yet nevertheless the hole for the greatest part was filled up with flesh; and it was told me that he was now turned preacher, and that he could deliver himself very distinctly without that Golden Plate. And in *Guilhelm. Fabricius* his 2 *Cent. Obser.* 74. *Claudius Deodatus* relateth the History of a wound, which by a sharp Sword was inflicted upon the *Pylorus*, or at the top and enterance of the smal Guts (as all the Chirurgeons present thought, indeed; but yet notwithstanding *Gilhelm. Fabricius* denieth it, supposing the Gut Colon to be wounded, which on the left side is annexed unto the Reins) and that it was miraculously Cured. But when after this (the Wound being covered all over with a Cicatrice) the sick person felt neer about the part affected a sharp pricking pain, and a swelling withal, it so happened, that when about the end of the year he had dispatched his affaires, and was returning homewards, in the mid'st of his Journey he was constrained to eate and empty his Belly, and then together with his Excrements he voided forth by the Belly the very point of the Sword that was thrust into him. But seeing that now adaies wounds are more seldom inflicted by Arrows (then in former times) therefore also in our daies the Chirurgical Extraction of Arrows is very rarely required: but whereas now adaies most Wounds are made with bullets from Guns, there is therfore a greater necessity incumbent upon the Chirurgeons of our times, that they extract and draw forth those Leaden Bullets that from Guns are shot and sent into the Body; touching which I shall speak further anon.

Chap. 6. *Of the Provision that is necessarily to be made for the binding up of Wounds.*

IF in the Wound there be nothing sticking that is extraneous and of a different Nature from the part affected; or if there having been somthing sticking therein it be drawn forth, we ought then to endeavour that the lips of the wound may be joyned together. But now seeing that for the right performing of this, there is a certain provision and preparation to be made, as necessary thereunto (although notwithstanding for the most part the same provision is required likewise in the Curing of Fractures) therefore in the first place we shal repeat somthing in the general out of our *Institutions* touching the dressing and binding up of Wounds; and we shall afterward treat thereof more particularly.

Unto the binding up of Wounds there belong swathing, the injection of the *Splenia* (we shall shew you anon what these *Splenia* are) the fitting of the Splints, Illaqueation, or casting about of a binder, and the right placing of the part when it is bound up.

Of Swathing.

A swathe what it is. Now a Swathe is a binder that is both long and broad; and a due and fit swathing is a drawing about, and rolling together of the Swathe-bands a-

bout the Member that is to be cured.

Now touching Swath-bands, *Galen* (in his *B.* of *Swaths*) hath written sufficient, and indeed somewhat largely, and therefore for our better knowledg in this Particular, we are to acquaint our selves throughly with what he hath written. But that we may briefly speak something according to our purpose, (and as before we promised you;) Swath-bands may be made of Linen Clothes first put unto other uses and somwhat worn, that thereby they may be made more soft and pliable; but yet they must be so strong that they may not be broken. For although the matter of Swath-bands may be threefold, Linen, Woollen, or Skins, yet now adaies we seldom use any other but Linen only. But then these Linen Cloths must be Clean, Smooth, Soft; which have neither any Seams or Knots sticking forth.

Differences of Swathes

Now there are various differences of Swathes; which are all taken from the Figure, length and breadth. They differ in regard of their Figure, in that some of them are made so as to be woon'd up, long and equally broad, and rolled round together: others of them Cut; which indeed consist of one Linen Cloth, but this is cut either in its extreme or middle parts: others that are sewed together, that consist of Swathes and strings ending in several Heads. Swathes differ in their length, in regard that some of them are longer, others shorter; and so in their breadth likewise.

Differences in the binding.

And then of the binding up (that is done by the Swathe) there are two differences; one simple, another compound, or manifold. The simple is either equal, or unequal. The simple equal is only round, which on both sides bindeth together the Member affected in a circular fashion, without any declining on one side more then another. But the simple unequal is divided into *Ascia* and *Sima*; which yet differ only in regard of their being greater or less; because that *Ascia* declineth but a little from that which is round, but *Sima* very much. Of various and several sorts of Swathing there are many differences, taken from the similitude of the parts that are bound, or of certain living Creatures, or of other things; touching which we may see sufficient in *Galen* his *B.* of *Swathes*; and in his *Second Comment upon the B. of those things that are to be done in curing of Wounds, Text* 7.

The swathing how to be instituted.

But that the Swathing may be rightly performed, it is first of al to be considered, from whence the binding is to be begun. For sometimes the binding is to be begun from the part affected, sometimes from the sound place nigh unto the part affected, and at other times also from the opposite part. And then next of all, in what manner the Swathe is to be drawn about. For sometimes the Swathing is to be begun from one end of the Swathe, and sometimes from the middle thereof. And Thirdly, We are to look wel that the Swathe neither binde and press together the part too hard, and likewise on the contrary that it be not over loose. For if it be too loose, it will not sufficiently keep the part together; and by its overgreat compression it will occation both pain, and an Inflammation. But now that all this may be rightly performed, the use of Swathing will teach us.

The use of swathing.

Now the Use of Swathing is twofold; one of it self, but the other only accidentally conduceth unto the Cure. Swathing considered in it self maketh much for the Cure, in regard that it bringeth together the parts disjoyned, contracteth the parts dilated, and setteth straight the distorted and writhed parts, keepeth within due limits the Member being set in its right frame, as also the conjoyned parts, repelleth the Humor flowing in; and if it be already flown in, it driveth and presseth it forth again. For in hollow winding impostumations the binding is begun from the very bottom, and endeth at the Orifice of the Ulcer. The extenuated parts are so to be bound up that the sound parts may be pressed together, and that the Blood may be forced unto the parts extenuated: which will be done, if the Swathing be begun from the sound, or the opposite part; from whence toward the extenuated part it may be a little loosned; and at length rolled about after the most loose manner upon or neer the extenuated part. But in the parts dilated, and when there is need of driving back the influx of Humors, the binding is to be begun in the place affected, and the two or three first rollings about let them be closer and harder then ordinarily.

But by accident these Swathes conduce unto the cure, when they are so administred, that they may contain those Medicaments that are applied for the effecting of the cure. Touching these see *Hippocrates* in his *B.* of *Fractures, Comment.* 1. *Text* 21. and in his 2 *B. Touching those things that art to be done in the way of curing, Text* 30, 31, 32, 33.

Of Splenia.

For the better binding up, there are likewise administred those things they cal *Splenia* which are Linen cloths folded together, and so termed from the Figure of the Spleen. They were by the Ancients called *Plumaceoli* because that they were made of Feathers sewed

sewed up between two cloathes: they are likewise called *Pulvilli* from the resemblance they have with a bolster. Now they differ in regard of their Figure, which is either long, broad, or thick. Their Figure is threefold, to wit, according to the end for which they are propounded, and the manner of their being imposed. For somtimes they are laid upon the part straight and long waies somtimes in an oblique manner, and somtimes transversly. And indeed they are somtimes laid on double, somtimes treble, and now and then four double; somtimes single, and somtimes more of them, according to their use and that which they ought to perform, to wit, the strengthening of the binding, for Members that are unequal in thickness, or for the making equal and filling up of parts that are lean and hollow; that so by their means the whole binding may become equal; and also for the defence of the parts from the weight and pressure of the Swathbands; and Lastly, for the pressing forth, and drinking up of the *Sanies* and Ichorous Excrements. And they are somtimes imposed dry; but most commonly they are soaked, and moistened in some kind of liquor that is fit and proper for the Disease and the part affected. Touching which see *Hippocrates*, in his 3 *B. of such things as are to be done in the Curing of Wounds*, *Text* 1, 2. and in his 1 *B. of Fract. Text* 32. and in his 3 *B. of Fract. Text* 21. As likewise *Galen* in his Commentaries.

Of Ferulæ, *or Splinters.*

Somtimes (for the more convenient binding,) there are administred those things they call *Ferulæ*; to wit, smooth Splinters, that are wont to be fitted unto bones that are broken and out of Joynt, after such times as they are set again, and returned unto their due and proper place. *Hippocrates* and other of the Ancients made them of the woody bark of the *Ferula* shrub; and from hence also they have their Name. Now adaies (in the want of other) these *Ferulæ* are made of the thin shivers or long thin Chips of Wood, or the Barques of Trees, or paper glewed together, and pieces of a hard and thick hide. But yet we are here admonished by *Guilhel. Fabricius* (in his 4 *Cent. Observat.* 98.) that the barques of Trees (especially while they are new and green) are by no means to be administred in Fractures instead of the aforesaid *Ferulæ*. For when they are throughly dryed they are apt to be contracted about the Fracture, and to excite pains; and somtimes again to move the bones out of their places.

Hippocrates requireth such *Ferulæ* as are smooth, equal, plain, and a little hooked and sloping at the very ends, that is, such as are shaved smooth on the lower part of their ends, on both sides somwhat shorter then the Swathing lying under it, lest that they press together the part beyond the Swathing. Now they are imposed upon the Fracture on every side round about, so that they may not stand distant one from the other less then a Fingers breadth; and they are so to be fitted, that the ends of the said *Ferulæ* be not placed above the Heads of the Joynts that stick forth, or the Nerves nigh unto the Joynts; or that they touch upon the naked Skin. See *Hippocrates, touching those things that are to be done in the Curing of Wounds*, *Tit.* 11. and in his 1 *B. of Fract. Text* 40. and in his 2 *B. of Fract. Text* 5. 7. 11. 64. 69. 71. And *Galen* in his *Comment.* And *Paulus Ægineta*, in his *Sixth B. Chapter* 99.

And unto the extream parts also that are grievously wounded, or broken, or disjoynted, (the Hands especially) there are somtimes applied little Coffers, or Chests of smooth Wood, so wrought that they may answer unto the Figure of the Member; or else such as are made of thin plates of Iron, or a hard Skin, or paper glewed together; that so they may hold together the parts united and conjoyned, that so they stir not, neither move to and fro, and so again start forth and fal out of their places.

Of *Laquei, or Binders.*

Unto the binding up of Wounds there likewise belongeth the injection of *Laquei* (as they term them) which we may fitly call Illaqueation. Now this *Laqueus* is properly a bond so knit and tied, that what is drawn together, or pressed down by weight, may be shut up and closed. And the use thereof is, for the extending of bones broken and out of Joynt, for the keeping of them in their places when they are set, and for the streightening and close binding of the parts. The differences of these *Laquei* are very various, taking their Names either from the inventors, or from their use, or from the similitude and Figure of some thing or other, or from their manner of knitting, or from their effect: which since that they cannot well be perceived nor understood without a manifest Delineation, and very hardly from a bare description, therefore touching this Particular, Consult that *B. de Laqueis*, that is commonly ascribed unto *Oribasius*.

Of

Of the due placing of the Member after it is bound up.

After that the affected Member is rightly bound up, it remaineth that it be likewise fitly placed. Now the due and fit placing of it consisteth in this, that the part have that position which conserveth the Natural figure thereof, such as is without pain, and fit for the cure of the disease. Now the member shall thus be placed, if all its parts, Bones, Muscles, Nerves, Veins, and Arteries, have that situation that they are neither distended, nor pressed together; if the Member be softly and equally situated; if in a hollow ulcer or wound the Orifice (as much as may be) look downward, that so the Sanies may be purged forth; and lastly, if in the placing there be a mean kept in regard of the binding up, and that the binding be neither too loose, nor yet over streight and hard. And indeed that there may in the placing be an apt and meet figuration of the Member, we must especially have respect unto two things, unto the Joynts, and unto the Muscles; to wit, in respect of the Joynts. That the Member have a middle figure (as *Galen* very often calleth it) which is without pain, to wit that in which we are both born, and accustomed to keep all our Members when we are out of Action; and in which no Muscles at all do act; and such as is equally distant from the extream motion of the Joynts, or their extensions, and inflections: and in regard of the Muscles, to wit, that on one part it hath Muscles, and the whole entir fibres thereof; and that neither a whole Muscle, neither its fibres be distorted.

Now placing Consisteth either in reposition, or suspension. A member is then fitly put back, when by certain props and stayes (as feathers, fleeces of Wool, or soft Clothes) it is so born up that it is made quiet, and rising upwards, lie alwaies equally and softly, so that it be neither shaken by any motion, nor assaulted by any flux; or that any *Sanies* or *Ichor* be therein retained. And from hence it is that (if the thigh be broken, and bound up) *Hippocrates* supporteth it with somthing like a Counduit pipe, (the ham being stretched forth) from the hip even unto the foot. Our Chirurgeons use to apply some certain props of straw or of paper rolled together like a Counduit pipe, and within filled up with hurds, and so involved and wrapt up in the extreme part of the linen cloathes; by which the whole Member is firmly held together, lest that it should unawares be moved.

But the Member is hung in a string and supported thereby, when the sick person either lieth down, or now beginneth to walk abroad. For although that while the sick party lyeth in his bed it sufficeth if that while he is awake he have his hand softly inclining upwards; yet, lest that when he is asleep he should unawaers move it, therefore it is not amiss for him to have it hung in a sling of a swathband. But it is especially requisite when the sick party beginneth now to walk, that he carry his Arm wrapt up and hung in a swathe, (which the Greek Physitians call *Tænia*, and *Celsus Mitella*) the narrow heads wherof let them be cast about the neck; and for the breadth of it, in that part wherein the Arm is enwrapped and born up, let it be so broad that it may contain the whol arm, that so there may be no part thereof that is not equally supported. And here for the more fit underpropping of the hands there is oftentimes great need of those little Coffers or Chests, of which but even now mention was made; upon which the Hand (when it is bound up) is to be placed; and then (with the said *Capsula* or little coffer) it is to be put upon the swathband.

Chap. 8. *Of the swathing of wounded parts.*

And that we may apply unto Wounds all that hath hitherto been said of swathing in general; the Chirurgeon when he is ready to bind up the wound must in the first place be very careful in stanching of the blood, if it flow forth over abundantly. But since that there happeneth not unto all Wounds any such extraordinary and remarkable hemorrhage, (but only when the greater vessels are Wounded) of the stopping and stanching of the hemorrhage we wil speak more below in the *fourteenth Chapter*. And now at the present (as for what concerneth the very swathing it self of wounds, the lips of Wounds when they are disjoyned are to be drawn together, & conjoyned: & when they are thus brought together they are then to be kept conjoyned; which without the solution of continuity may be done two waies; either by swathing, or Glew, or by stiching, and sodering it together *per Glutinum* (as they term it) which what is meant thereby, we shal anon shew you.

Swathing. And First, as for swathing, this suiteth very fitly unto wounds that are made according to the length of the Member, and which are not very deep; and where we have hopes that by swathing alone the lips of the wound may be joyned together, there stitching and sewing

ſewing is not raſhly to be practiſed. But now let the linen ſwathe be neither too hard nor over ſoft; the breadth whereof ought to be ſuch, that being once caſt upon the wound it may not only comprehend & contain the ſaid wound, but may likewiſe comprehend ſomthing on either ſide, even unto the very confines of the ſaid wound But if the Wound ſhal chance to be longer, the binding up of the wound is then better performed by a narrow & ſtreight ſwath; that is, one of about three fingers breadth. Now this binding is accomplished with a ſwath of two heads, (as I may ſo ſay) or that hath a double beginning; and in Wounds that are not very long the middle of the ſwathe is firſt of all impoſed upon the oppoſite part of the wound; and the rolling of it about is begun from it, and drawn toward the Wound, and above the Wound it is ſtrained; and in this manner the lips of the Wound are rightly drawn together; and then after this, both heads of the ſwathe are rolled this way and that way, that ſo the lower part thereof may be drawn about by the lower part of the Member; but the ſuperior by the higher part of the member; and all to this end that ſo the humors may the better be preſſed forth of the part affected. Let this Ligature be ſtreighter and harder above upon the place affected, then in the parts that lie neer unto it; and let it be ſuch as is neither overlooſe, nor too ſtreight. For if it ſhould be too looſe, it would not contain nor keep in the lips of the Wound being drawn together; and if it be overmuch ſtrained, it would then cauſe pain, an afflux of the humors, and an inflammation. And therefore let the term or time of the ſtraining be, as long as the ſick perſon can wel endure it. And in the Winter (by reaſon of the cold) the rollings and ſwathings about may be the more; but in the Summer the fewer the better, leſt that by reaſon of the many windings about of the ſwath the part affected grow over hot. The knot is to be knit a good way diſtant from the Wound, or rather the heads of the ſwath are to be ſewed together. But now that in the greater ſort of Wounds the drawing together of the lips may be made the eaſier, the *Plumaceolus*, or little pillow, or linen Clothes many times doubled, but moſt commonly four double (of all which we ſpake before) are to be adminiſtred: but according to the judgment and opinion of *Avicen* (*in the fourth ſect. of his fourth Book, tr.* 1. *Chapt.* 8) The triangular pillows are far more commodious; which two of them together (on either ſide one) are put unto the wound; ſo that the ſides of both of them being diſpoſed and placed according to the length of the wound, (and therefore thoſe aforeſaid pillows, &c. ought to exceed the length of the Wound) may have reſpect each to other. For the ſwathe being drawn upon the Angle of the Triangular Pillow forceth forward the pillow (together with the lip lying underneath) unto the Contrary part; and (as *Avicen* ſpeaketh) ſtraineth together only upon the fiſſure or cleft of the wound; which would not ſo be, if thoſe pillows were four ſquare.

Of the ſtitching or ſewing of Wounds, with Glewing.

But now whereas in tranſverſe and long Wounds ſwathing alone will not ſuffice for the drawing together of the lips of the Wounds, and ſo keeping and preſerving them, in this reſpect therefore there wil be need of ſtitching. But ſeeing that in the Wounds of the face ſtitchings cauſe a great deformity, and in other long and great Wounds the ſtitches are oftentimes broken before the agglutination of the Wound; and becauſe likewiſe that tender bodies wil by no means away with ſewing, (which is done with the needle) therefore a certain Glutination, or ſtitching with gluing hath been invented, which draweth together the lips of the Wound without any the leaſt mangling of the wounded part, or pricking of it with the needle. Now this is the proviſion that is to be made. Strong Linen Cloathes are prepared, that are equal, ſoft, quadrangular, or triangular, or of ſome other figure, according as the nature of the ſituation of the Wound and member unto which they ought to be applyed doth require; let theſe be either folded together, or ſewn (ſo as that the ſtitches may be no great eyeſore) in that part wherein they have reſpect unto the Wound; and let threads now and then be paſſed thorow them in the broadeſt places of them. Unto theſe Linen Clothes are to be faſtned little handles or loops of threads many double, and twiſted, and then waxed; at the ſame diſtance that the ſtitches are wont to be made, or if you pleaſe, ſomwhat a leſs diſtance. Upon this linen let the aforeſaid *Glutinum* be ſpread, that is made of aſtringent and viſcous clammy Medicaments; ſuch as are, the white of an egg, Bolearmenick, Frankincenſe, Maſtick, Sarcocol, fine flour Parget, Tragacanth, Corralls, and fat Roſin, As for inſtance.

Take *Bole-Armenick, Sarcocol, Maſtick, Dragons Blood, of each two drams*: Let them be mingled with the white of an Egg. Or,

Take *Of the fineſt Flour, and Maſtick, of*

each

each half a dram; Bole-Armenick, Corals, Sarcocol, of each one dram; Dragons Blood, two scruples. Mingle al these with the white of an Egg.

And if we fear that the said *Glutinum* may be separated (which is chiefly caused by the *Sanies* or thin Excrements that flow forth of the Wound) then the Rosin of the Pine, or of the Pitch Tree is to be mingled together with the rest, these not admitting of any humidity. As,

Take *Dragons Blood, Frankincense, Mastick, Bole-Armenick, Rosin of the Pine Tree, of each as much as you think fit; and let them be mingled together with the white of an Egg.* The Linen being in this manner spread over with the said Glue, and furnished with their little handles, two on both sides, at the sides of the Wound, (the distance of a Thumb one from the other) are so to be fastned thereunto that the handles may rightly answer the one to the other: and they are there to be left so long, until that the Glue being dried up the Linen stick fast unto the Skin; which commonly is wont to be done in the space of four or five hours. The Linen now sticking fast unto the Skin, the handles or threads aforesaid are to be drawn close together, and then tied fast one to the other, that so the Lips of the Wound may be rightly united. And in this manner, without any pain at all, and without any Cicatrice and Deformity (such as is wont to be caused by the Needles point) the Lips of the wound are drawn together, and being thus brought together and united they are so kept and preserved a longer time then by that sewing or stitching that is done with the Needle. The aforesaid kind of sewing seemeth to have in it this one only inconvenience and discommodity, to wit, that it is of little or no use until after six or seven hours (for sooner then this it will not be dryed, so as to stick fast unto the Skin:) whereupon it is, that many do first administer the sewing, and then afterwards the glew. But the aforesaid delay can bring no great danger and detriment along with it. And if any danger be feared, instead of the aforesaid Glue, an emplaster may be provided, (which sticketh immediatly) such an one as is described by *Cæsar Magatus*, in his *first B. of Wounds, Chap. 59.* As,

Take *The Gum of the Fir Tree, four ounces; the Liquor of the Elme-Tree three ounces; Rosin of the Pine, Greek Pitch, and Ship-Pitch, and Wax, of each one ounce; Ammoniacum, Mastick, Tacamahaca, of each ten drams; Sarcocol, Dragons blood, Gum-Juniper, and Gum-Hedera, of each six drams, the Root of the greater Consound, of round Aristolochy, Bistort, and Tormentill, of each two drams,*

The Gums that will away with melting are to be dissolved over the Fire with a portion of that which sweateth out of the Fir-Tree; and then the rest that are wont to melt at the Fire being dissolved according to art let them be added, and then let them be well and diligently mingled together, that so they may be reduced into one Body; and then after cast them altogether into an Alembick, and by the heat of the *Balneum* draw forth the Liquor; and when you conceive that the feces are freed from al their Watery Humor, unto these when they are again melted by the heat add the rest of the powders, and mingle them together with al care and diligence; and then again destil them, until that all the Humor be wholly evaporated; and then (withdrawing the Fire) suffer the *Balneum* to cool. For so it is, that the matter which is conteined in the Vessel will become solid, like unto a Cerote, and it will be very tenacious; neither is it by the heat of a mans Body so to be melted and made thin that it forget its office and what it hath to do.

I my self also am wont to use this following, which may be provided with far less labour.

Take *Bole-Armenick, Mastick, Dragons Blood, Frankincense, of each one dram; Gum Tacamahaca, two drams;* And make a powder; which with a hot Pestle you may spread upon Leather, that an Emplaster may be made thereof.

Cæsar Magatus hath likewise a peculiar manner of applying this future by Gluing. He extendeth and spreadeth a part of such a like Cerote upon a new thin Linen cloth; and then with a pair of Cizers from this linen Cloth he cutteth off so many parts (of a Fingers length, or somwhat longer, and as broad as an ordinary point that we use to truss with, but in the ends of them somthing broader) as the stitches that seem to be requisite in a Wound, or not many fewer; and the first he applyeth in the middle of the Wound, and yet so, that it may stick only unto one side of the Wound in the half part of it, and that the rest be free. Unto this, at the side, (but yet opposite unto it) he applieth another; and so by turns he proceedeth, applying one on the right part, and another on the left: and after this, he layeth hold on the parts that are free, (and that as yet stick not unto the Skin,) one with his right hand, and the other with the left, and draweth them both together toward the opposite Lip, until that the Lips be so drawn together that they touch one the other: and afterwards he applieth both the parts that he held in his hand unto the opposite lip, unto which they did not stick; and here he is very Curious, and takes a great

a great deal of pains to make them ſtick right on all parts: and ſo likewiſe he proceedeth in the reſt of them; ſo that betwixt one and another there is left as much ſpace as is otherwiſe wont to be between the ſtitches.

And indeed the well experienced Chirurgeon, who by his long practiſe knows well how by ſuch like Emplaſters that ſtick cloſe unto the Skin (of which there are many ſorts of them to be made) to conjoyn the Lips of Wounds; this Chirurgeon, I ſay, in almoſt all Wounds (Yea even in the very firſt dreſſing) knows how very well to be without the ſaid ſewing or ſtitching made with the Needle, which is both cruel, Bloody, and painful. And certainly it were far better that the Chirurgeons ſhould accuſtom themſelves unto this manner of ſewing Wounds together; in regard that in the other which is performed with the Needle after a kind of Barbarous faſhion they oftentimes commit many Errors, whiles that in ſtitching of the wound they excite more pain then was cauſed by the wound it ſelf: and uſing Needles that are too thick they take in more of the Skin then is requiſite, and ſo often leave the Lips of the Wounds writhed, and pleited; inſomuch that the Skin is not Joyned cloſe unto the Skin, neither the Fleſh to the Fleſh; but the Skin is ſewed in the midſt between the Fleſh: or if they do their endeavor to avoid this evil they fal into another as great, by taking ſo little hold of the Skin that the Wound is left hollow, and the ſtitches within a very ſhort time break out again.

Of the Suture, and Buttons.

And al theſe Conjunctions and drawings together of the fleſhy and ſoft parts are performed without any wounding of the ſaid parts. There is yet another alſo, which is done by diſſolving of continuity. For not only the Ancient Chirurgeons, but thoſe likewiſe of our daies (in Wounds tranſverſe, and great, and altogether in thoſe wherein Swathing only will not ſuffice for the drawing together the Lips of the Wounds) uſe ſewing and Buttons.

What is required unto ſewing of Wounds.

Unto the ſtitching or ſewing of Wounds there are required three things, a Needle, a Thread, and the little hollow Inſtrument, having holes through one end of it.

A Needle.

The Needle that is required (for its more eaſie penetration) ought to have a Triangular point, (which the Currriers moſt commonly make uſe of,) indifferently thick, (that ſo it be not broken, or paſs through the more difficultly) and a little hollowed in the Tayl thereof, that the Thread hinder it not in its paſſage forth. Moſt Artiſts require a Thread of Silk; yet nevertheleſs others reject this, in regard that it eaſily breaketh the Skin, and they take one of Flax, doubling it, that it may be firm and not eaſily broken. And this they will have not to be over much writhed, but waxed, equal, and of a mean conſiſtence. And when the Needle is paſſed through one lip of the Wound, it is then likewiſe to be put through the other Lip of the Wound: and leſt that the Lip through which the Needle ought in the Second place to be paſſed through, ſhould in following fal under the other, and ſo be drawn aſide too much from the other, therefore without there is an inſtrument laid unto it, which they term *Cannula*, or *Canalicus*. To wit, a little Pipe, partly Gold, and partly Braſs, or elſe all of Silver, having holes through one end thereof, that ſo through the holes the Needle may paſs; and that the Lip of the Wound may reſt it ſelf upon the Pipe, leſt that whiles the Needle is paſſing through it ſhould be moved, and ſo not follow upon the drawing forward of the Needle and Thread. And yet nevertheleſs the Lip of the Wound may likewiſe be held together by the tops of the Fingers, to wit, the fore Finger, and the middle Finger; and with the other it may be ſewed together, if ſo be that the Thread paſs through readily, which will be, if in the Tayl the Needle be hollow about the hole (as we have ſaid) and that the Thread in reſpect of its thickneſs bear a proportion with the Needle.

Thread.

The Inſtrument Cannula.

Now the ſewing is performed after this manner. In the middle of the Wound (the Needle drawing after it a double Thread) if the Wound be great the Lips of the Wound are to be thruſt through, and a knot being tied the Thread is to be cut off a little above the knot. And then in the middle ſpaces on either ſide other holes are to be made with a Needle and ſingle Thread, and a knot being then likewiſe made the Thread is to be cut off; and this is to be continued, until the Lips of the Wound be rightly ſewed together. And this Suture is termed *Interciſſa*, becauſe that after every prick a knot is tied, and the Thread cut off. But we are well to look, that the ſtitches ſtand neither too wide, nor yet too cloſe; for if they be too thin, they will not rightly hold the Lips of the Wound together; and if they be over thick, they then cauſe pains and Inflammations. And therefore between one prick and another let the ſpace that is left be ſuch, that

The Firſt way of ſewing.

The Suture interciſſa.

the Skin may as it were follow the Needle drawing it. Some will have it, that betwixt every ſtitch there ought to be a ful Fingers breadth. But it is very ſeldom that there is need of ſo many ſtitches; neither do all Wounds require one and the ſame number of ſtitches; but according as the Wounds do gape more or leſs, ſo there will be need of more or fewer ſtitches. And yet notwithſtanding it will not ſomtimes be amiſs, that not only the Skin but likewiſe that ſome of the fleſh (if it lie underneath) be taken in, to the end that the ſewing may be ſo much the more firm, and that the Skin be not broken thereby. And yet nevertheleſs we are to look well unto it, and to be exceeding Cautious that the Tendons be not prickt with the Needle.

And this is altogether the moſt uſual and moſt Convenient manner and way of ſtitching and ſewing of wounds; in which (this is likewiſe to be underſtood for all other caſes) this only we are yet to acquaint you with (out of *Celſus* his 5. *B.* and 26. *Chap.*) that the ſtitches ought ſo to be made, that the very Lips are not indeed quite to touch one the other; that ſo if there chance to be any humor gotten together within, there may be made a paſſage whereby it may flow forth. And hence it is, that the Chirurgeons are likewiſe wont to thruſt in Tents anoynted with ſome fit and convenient Unguents; that ſo the Humors that are wont to be gathered together in the wounded part may flow forth; and then alſo that the Medicaments may the better penetrate unto the bottom of the Wound.

The Uſe of Tents.

Indeed *Felix Wirtzius* rejecteth the Uſe of Tents in Wounds of the Joynts, and of the Hands, in his *ſecond B.* of *Chirurgery*, and 13. *Chap.* But *Guilhelm. Fabricius* upon very good ground refuteth this Opinion, in his 4. *Cent. Obſervat.* 76. and by four Examples he proveth the ſame to be both abſurd and dangerous. The Firſt Example is of a certain Citizen of *Colen*, who neglecting theſe Tents, a Wound that he had received in his Hand cloſed up in the ſuperficies thereof; whereupon about the fourth day a great pain aroſe, which was followed by a Feaver, an Inflammation, and a *Phlegmone*, ſo that the Hand was in many places exulcerated; and it was not to be reſtored again without much labor and long time.

The Second Example is of a Citizen of *Lauſanna*, who pricked the hollow of his Hand with a Pen-knife. And becauſe the Chirurgeon (by reaſon of the narrowneſs of the Wound) could not by Tents keep it open, there followed thereupon moſt grievous Symptoms; and the ſick perſon could hardly be reſtored to his former ſoundneſs until he had long endured much Pain and Torture.

The Third is of a certain Country Woman, one *Hildena* by Name, who with a Thorn prickt the very tip of her fore Finger. But when as (for the cauſe aforeſaid) the ſuperficies of the Wound had cloſed up, and the *Pus* or filthy corrupt mattier was gotten together about the Nervous parts, there aroſe a great pain; and upon this there ſoon followed an Inflammation and a Gangrene, and from thence a *Sphacelus*. And yet notwithſtanding this Woman (having had her Finger cut off even unto the Hand-Wriſt) at length recovered.

The Fourth Example is of a certain Boor nigh unto *Lauſanna*, who had a Thorn run into his Ankle-bone. But he neglecting the ſame, and the Orifice of the part where the Thorn went in ſhutting up too ſoon, there aroſe firſt a pain; and then there followed ſoon after an Inflammation and a Gangrene; and at length a *Sphacelus* invaded and ſeized upon his whol Leg: and refuſing to give conſent that the Leg ſhould be cut off, he died within few daies after.

It appeareth therefore from theſe Examples, that Narrow Wounds (albeit they are in the Nervous parts) are ſo long to be kept open, until the Wound ſhall be ſufficiently purged. For ſo it is that in every Wound whatſoever there wil get together more or leſs of this *Pus* or purulent mattier, (as we ſhal afterward more fully ſhew you) and this, if there be not opened for it a paſſage forth, muſt needs be there reteined; and this by little and little groweth hot, and becometh very ſharp; whereupon in the wounded part (eſpecially if it be Nervous) there followeth a pain, which by attracting the Blood and the Humors exciteth and cauſeth moſt grievous Symptoms.

And yet nevertheleſs *Fabricius* here adviſeth us, that the Tents are with ſuch Art and induſtry ſo to be fitted and fabricated, that at the leaſt they may hold together the gaping ſuperficies of the Wound, until the reſt of the wounded parts (to wit, the Fleſh, and the Nerves) be ſufficiently purged; and yet ſo, that they may not by any means hurt the Nervous parts. And that therefore the depth of the Wound is diligently to be obſerved; and great care to be taken, that the edge of the Tent (and more eſpecially if either a Nerve, or any thing Nervous be diſcovered and laid open) preſs not together the bottom of the Wound. But now in thoſe Wounds that are ſo narrow that they will not receive

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in any Tent that is thick, and that that is slender and weak (as that which is over flexible) is turned this way and that way, and therefore cannot reach unto the very bottom of the Wound; in this Case he tels us that his custom was to impose a piece of a Gold or Silver thread, (as long as the Wound was deep) wrapt up in fine Linen, and anointed with some Anodyne and Digestive Unguent.

When the Lips of the Wound shall in this manner be conjoyned, they are wont commonly (and indeed not amiss) to impose the white of an Egg well shaken together, and put into hurds, with this following powder.

Take *Frankincense two parts, and Dragons Blood one part*; And make a Powder. Or,

Take *Bole-Armenick and Terra Sigillat. of each six drams*; *Frankincense, Mastick, Sarcocol, of each two drams and half*; *Myrrh and Aloes, one dram and half*; *Tragacanth, Dragons Blood, of each one dram*; *Barley Meal, and Bean Meal, of each half a dram.* Make hereof a Powder, and mingle the same with the white of an Egg shaken together, and put upon hurds, and so imposed upon the wound; upon which also other hurds that is only wet with the white of an Egg is to be imposed.

Neither is this Medicament administred but for very good Reason; since that it suppresseth the Flux of Blood, asswageth pain, and preventeth Inflammation. But now if there be no fear at all of any such excessive Flux of the Blood, or of any afflux of the Humors, we shal not then need to make any such provision against it; seeing that the Hurds and those Medicaments stick so Tenaciously unto the part, that being throughly dried on they contract the said part, causing great trouble unto the same; and when they come to be removed they excite much pain.

Other waies of Sewing of Wounds.

And now although that what we have already said might suffice, as touching the stitching or sewing of Wounds; yet nevertheless we think it not amiss here further likewise to add some other waies of the Sewing of Wounds, as we meet with them in several Authors. For there is moreover another manner also of sewing of Wounds; which is indeed performed altogether in like sort as Leather-dressers are wont to sew their Skins together; and this is then only fit when the Intestines are wounded and the Veins and Arteries cut asunder.

There is yet another way of Sewing them, which is done with two Needles: and this way *Celsus* used, and describeth it in his 7. *B.* and 16. *Chap.* where you may see it fully set down.

The Buttons of Wounds.

There is among the Ancients mention made likewise of Buttons: For (as *Celsus* writeth in his 5. *B.* and 26. *Chap.*) if the Wound be in the Flesh, so that it gape, and that the sides thereof cannot easily be drawn together into one, then sewing is improper, and in this case buttons are to be imposed (the Greeks call them *Aggleræ*) that may only a little contract the sides, to the end that afterwards the Cicatrice may be the less broad. And because that the way and manner of Uniting the sides of the Wound by buttons was generally so wel known unto them; from thence it was, that neither the matter of these buttons, neither the form of them was ever sufficiently described by the Ancients. *Guido* (whom many follow) writeth that these buttons were made of Iron Circles as it were, or Semicircles, a little crooking on either part; the hooks whereof being on both sides fixed and fastened within the Lips of the Wound did answer exactly the one to the other. But seeing that in this manner to fasten in such hooks as these, and being so fastened there to keep them in the Skin, and especially the Flesh that is so sensible, was nothing else but a keeping there of so many pricking sharp-pointed Needles as it were, with an intolerable pain; it it not therefore Credible that the Ancients by Buttons do understand any such Iron Instrument, to be fastened within the Skin, and there exciting pains that were not to be endured. The Opinion of *Gabriel Fallopius* is far more probable, who (in his *Tract of Wounds in General, Chap.* 12.) tels us that the Button was that kind of sewing that above we called *Intercisa*, and which at this day is in very frequent Use; in the which both the Lips of the Wound are by a Needle drawing after it a double Thread thrust through; and upon the Wound with three turnings in both the Heads of the Thread are drawn together; and tied up into a knot. And although that in Authors there be mention made of Gold and Iron Buttons; yet notwithstanding we are here to know, that the Word Button is a general word, and signifyeth every Instrument whatsoever that Joyneth and keepeth together any things unto which they are applied. And so *Cæsar* (in the 4. *B. of his Warrs in France,*) speaketh of Beams or Rafters conjoyned with Buttons.

There was yet (as we read) another way among the Ancients of sewing and stitching of Wounds; (but this they thought not so convenient, and therefore it soon ceased as to the use thereof) in the which they on both

sides thrust through the Lips of the Wound so many Needles drawing Threads as they thought necessary for the Conjunction of the Wound; and then after this above the Wound they woon'd a Thread about both ends of the Needle; in the very same manner as Women (when they intend to keep their Needles in the Garments they are making) rowl together their Threads about both the ends thereof.

As touching the binding up of wounds, this is likewise to be observed; that we make an exact enquiry, whether the Wound be a simple or single one, or else whether it be reduplicated, and manifold. For it sometimes so happeneth, that although there be but one Wound in the Skin, yet notwithstanding in the Muscles under the Skin there are two or three. For if this should so chance, and that the Chirurgeon should Cure only one of the Wounds, and altogether neglect the other that lieth hid, then will *Pus* get together in that other wound, and there cause great pain, Inflammation, Feaver, and other grievous Symptoms. Of the truth of which *Gulielm. Fabricius* (in his 4. *Cent. Observat.* 84. and 85.) giveth us two remarkable Histories. Where he likewise teacheth us, that the hollow nook that lieth hid may be opened; and there he also describeth, and plainly delineateth unto our view those Instruments that are fit and requisite for this purpose.

Chap. 8. *Of those Medicaments that are necessary for the Curing of Wounds.*

And these are the offices of the Chirurgeon, which he ought to perform in and about the Curing of Wounds; but the very uniting and sodering together of the wounded parts is the Work and Task of Nature; which oftentimes likewise, without any help from Medicaments, (and this especially happeneth in inward Wounds) agglutinateth those things that are disjoyned. And therefore, since that Nature is the Efficient Cause of Conglutination, and Blood the matter thereof, it is necessary that these two be rightly disposed, and in a due temper. For first of all, the truth is, since that the faculty is not indeed hurt in it self, and yet notwithstanding may be frustrated of its end, unless the instrument (which here is the temperament of the part, and the innate heat) be as it ought; therefore we are to take care that the wounded part have its due and natural temper. And moreover (in the next place,) our endeavour must be that the Blood that floweth thereto exceed not its just quantity, neither be less then what it ought; and likewise that it be good and pure. For the vitious and bad Blood that floweth thereto is so far from being fit to Conglutinate, that oftentimes it exciteth many dangerous Symptoms. And therefore if it be impure it is to be corrected, and the vitious Humors all of them to be evacuated. And there is also a due and right Course of Diet to be instituted, and all sort of meats to be avoided that afford a naughty and unwholsome Juyce, from which the Blood that is generated must needs be vitious. When we have thus taken care in these things, then afterward in the curing of the Wound there are also two Offices of Nature. The first whereof is, that the *Pus* she generateth be in a due proportion; and Secondly, That she Conglutinate those parts that are disjoyned. For first of al, (and although that *Galen* make no express mention thereof, whiles that he treateth of the curing of Wounds in the general; yet *Rhases* in his 13. *B.* and 14. *Chap.* and *Avicen* in his 4 *Sect.* and 4 *B. Tract.* 3. *Chap.* 2. and *Celsus* in his 5 *B. Chap.* 26. tel us, that) there is a certain *Pus* or Purulent mattier flowing forth of the Ulcer so soon as it once begins to give any hopes of recovery; and therefore this *Pus* must in the first place be furthered in its motion, and that then the Ulcer is to be Cleansed and filled up, and at length after this is done the wound is to be closed up with a Cicatrice. And happy experience hath indeed approved of that kind of curing; and those Medicaments that are for this end applied are commonly called Digestives. Neither is this without Reason. For whenas even out of the smallest Veins (when they are cut asunder) in the wounded part there floweth forth some of that Blood that by Nature is destined to flow unto the part, for its nourishment, this sticking in the pores of the part, and it being so that it cannot be carried unto the part whither it tendeth, it is by Nature converted into *Pus*. And furthermore the very wounding it self hath Joyned with it some kind of Contusion, and the part affected is altered by the Ambient Air. And therefore there is a necessity that what is altered should impostumate, and be turned into *Pus*. And therefore in this the Physitian ought to succour Nature, and to administer those Medicaments that help forward that generating of *Pus* (these Medicaments they commonly cal Digestives) and afterwards to apply Sarcoticks, or such as Agglutinate. But here notwithstanding Authors seem a little to differ in their practise. For some of them (the said Digestives and Suppuratives being wholly neglected) presently administer those Medicaments that dry much, to wit, Balsams, either

ther Natural or Artificial (of which we shall speak more hereafter) with the which they both anoint the wound al over, and instill it likewise unto the very bottom of the wound, and by Tents also impose it upon the same. Others there are that in the first place make use of those Medicaments that further & help on the *Pus*, which they call Digestives. And *Hippocrates* himself seemeth to have approved of both these wayes, when (in his Book of Ulcers) he thus writeth. *Al the newer Wounds (saith he) as well themselves, as the parts situate round about them, are but little or not at all infested with an inflammation if they be with al speed suppurated, and if that the pus of the wound be no waies suppressed by some small bone, as being intercepted thereby: or if we take care to prevent that nothing may come unto the pus but what is necessary, and that in as small a quantity as possibly may be; but that we dry it as much as may be with a Medicament that is not at al troublesome.* And experience hath taught us, that in both these waies of curing the Chirurgeon hath attained unto his end, and what he desired. And yet nevertheless, it seemeth not that both these Medicaments are to be made use of without any kind of difference.

For in regard that those Digestive Medicaments so commonly made use of are more moist, if they be without great caution and overlong administred, the matter beginneth not only to be digested, but also to putrefy; and the Wound degenerateth into a sordid Ulcer. For seeing that Nature is the author both of Concoction, and also of the generating of flesh the native heat and the temper of the part (Natures instruments) are to be preserved; and we must endeavor that the medicaments may answer unto the temperament of the part. And therefore although that the former way of curing may have its place in those parts that are fleshy, as being such as are more moist, and in which there is much of the blood that is to be turned into pus sticking in the pores of the part, which (that so the pain and the inflammation may be prevented) ought as soon as may be to be converted into pus; which work of Nature those drier kind of Medicaments might more easily hinder: yet in the parts that are more dry those drier Medicaments seem to be more commodious and proper; which as they may preserve the temperament of the part, so they themselves may likewise help forward the necessary generation of the *Pus* or purulent matter. And therefore the safest way is, not alwaies to confide in one Medicament alone, but rather to compound them according to the Nature and temper of the part; and to mingle Digestives with Sarcoticks and those that Agglutinate; since that experience testifieth that such are used with far better success then meer Suppuratives; as *Franciscus Arcæus* writeth that with his Balsam or Unguent (which we shall anon acquaint you with) applied forthwith in the very beginning, he himself most happily cured the greatest and most grievous Wounds; the use whereof I my self have likewise very often experienced with very happy success. And therefore I will now subjoyn such Digestives, which are not meer Suppuratives.

Digestives, or those things that further the Pus.

There may then be provided Digestive Medicaments, or such as further the purulent matter, *of the yelks of Eggs, Butter, Oyl of Roses, Oyl of Mastick, Rosin of the Turpentine or Fir-Tree, Wheat flour, Frankincense, and Mastick.* As,

Take *Turpentine washed in white Wine, two ounces; the yelk of one Egg; Barley Meal, and Honey, of each a sufficient quantity*: And make an Unguent. Or,

Take *Turpentine washed in Wine, May Butter unsalted, of each one ounce; Frankincense and Mastick, of each a like sufficient quantity.* Mingle them. Or,

Take *Turpentine, half an ounce; Frankincense, one dram; fresh Butter, one ounce; the yelk of one Egg;* And mingle them. Or,

Take *Citrine Wax, one ounce; Oyl, four ounces; Frankincense and Mastick, of each two drams; fresh Butter as much as will suffice, the yelks of two Eggs*: Mingle them. Or,

Take *Oyl of Roses, half an ounce; Turpentine, one ounce; the yelk of one Egg;* And mingle them.

So soon as ever there is any appearance of good *Pus*, the next thing we are to do, is, that we Conglutinate that which is wounded and disjoyned.

The union of the Parts *how caused.*

Now we are taught by *Galen* (in the 91. *Chap.* of his *Art of healing*; and in the 3. *B.* of his *Meth.* of *Physick*, *Chap.* 4.) that the Union of the Parts disjoyned in Wounds is wrought in a twofold manner; to wit, either by a true Union, which is by a *Medium* of the same kind, and not by the intervening of any other substance; or else by a *Medium* of a different substance. The former Union they cal a Union according to the first Intention; because that such a Union is intended both by the Physitian, and also by Nature her self. The other they term a Union according to the Second intention; because that both the Physitian, and Nature, when they cannot attain unto what they primarily intend; they then do what they can.

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In the former manner the soft parts and the flesh are united and grow together; but the hard parts in the other manner; to wit, the bones, and the Skin; of which those are united by a *Callus*, but these by a Cicatrice. Unto the former Union is required a substance of the same kind, and a strong Active faculty; which in the other are wanting. For in the Fleshy and soft parts there is present abundance of Blood; and in these the heat is strong; and thereupon the Blood by a very smal alteration may be changed into Flesh, whereby the wound may grow together. But in those parts that we call spermatick, and the harder parts, (the Nature of which parts being at a far greater distance from blood, and the Native heat of these parts being much weaker) it is not the very same that is generated anew, but some thing like thereunto. For instead of a Skin there is bred a Cicatrice (most like indeed unto the Skin, but harder and thicker then it) and instead of a bone there is a *Callus* produced. And this distinction of *Galen* (as being that which is generally and commonly received) I my self have likewise followed (in the 5 *B.* of my *Institut. Part* 2. *Sect.* 2. *Chap.* 4.) and even in his very manner. But it seemeth altogether to stand in need of some kind of Explanation. Now this especially consisteth in the division of the part into parts Spermatick, and parts proceeding from Blood; by which it is determined, that certain parts are generated from the Seed, and certain of them from the blood. Yea, some certain Physitians there are (among whom *Cæsar Magatus* in his 4. *B.* and 15. *Chap.*) who deny that the blood is the immediate Aliment of the Spermatick parts; but they write that there is a necessity, that if the blood ought to nourish the Spermatick parts, that then the seed must first be made.

But it is not my purpose here in this place in many words to discuss that Question; the which, as others, so *Andr. Laurentius* (in his 1 *B. of Anatomy, Chap.* 21. *Quæst.* 7.) hath so largely and fully controverted. I conceive this to be the truer Opinion, that the first delineation of all the parts in the Womb is wrought by the Formative faculty from and out of the Seed. Whereupon *Hippocrates* (in his *little B. of Originals*) writeth, *that the Conception hath in seven daies all whatsoever it ought to have; all the Members, the Regions of the Eyes, the Ears, the Hands, the Fingers, the Thighs, the Feet, the Toes, the Privities*, &c. But now seeing that the Mass of the Seed is but little, it is impossible that the Bulk of the whole Body should from the Seed acquire that magnitude that it ought to have. And therefore afterward the parts take nourishment and increase from the Mothers Blood in the Womb; and afterward the Child being brought forth into the light, the parts are augmented from the Blood, and so even unto the end they are nourished with the blood. Which manifestly appeareth even from this, that the very bones when they are at any time shaved yield forth Blood, which is their Aliment.

But now, that which some affirm touching those parts we cal Spermatick, that they are nourished by the Seed, is a thing most false. For how can so great a bulk of the Body be formed, nourished, and augmented from so smal a Mass of Seed? And then again, the Seed is no where else generated but in its own proper Vessels. Yea moreover, Children (whose bones nevertheless are nourished and augmented) do not generate any Seed. Neither is it sufficient, what *Laurentius* saith, that the blood variously changed, and suffering many alterations, made white, and thickned, is nothing else but Seed. For this is most false. For neither is the Seed any where else generated but in its own Organs; neither are other substances Seed, although that in whiteness they are like unto Seed.

And therefore albeit that those white and more dry parts (which they commonly cal Spermatick) be generated and nourished from the Blood suffering many Changes; yet nevertheless in very truth they are generated and nourished from the Blood. And therefore it is true indeed that the flesh that is generated for the agglutinating of the Fleshy part of the Wound is altogether like unto the former, as being such into which the blood (by reason of the neer alliance of the matter, and the strength of the Fleshy parts) is most easily changed: but yet I shall not rashly affirm, neither easily beleeve, that the Skin and the bones, and the rest of the Spermatick parts may be united by any thing Heterogeneous; and yet without any absurdity I think it may be said, that the Cicatrice is a Skin, and the *Callus* a bone. For although there appeareth some kind of difference between a Cicatrice and the Skin, and between a *Callus* and bone; yet nevertheless they are not of a different substance; but that dissimilitude proceedeth from thence, that the blood needeth many and more laborious changes, that it may be made Skin, Nerve, or bone, then that it may be made flesh; and the heat of these parts is the weaker, in regard that it was weakned by the Wound. Wherfore the Formative faculty indeed generateth both the Skin, and the bone, but such as are not of so great account as are those that are generated in the first Formation. And yet

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in the mean time, although the Cicatrice and *Callus* differ somwhat from the former Skin and Bone, they are not for all this to be said to be of another kind. And that also even for this Reason, because that the Cicatrice is not at any time generated but from the *Cutifick* faculty, neither the Callus but from the *Ossifick* (or bone-breeding) faculty; and therefore hence likewise it is (as we told you above, in the 2. *Part*, *Chap.* 2.) that there is never any Skin generated from Flesh; but the Skin is evermore generated from the Skin; and indeed oftentimes a very great portion thereof, as is evidently to be seen in the Members that are cut off. For who is it that will not rather cal that Skin with which the Flesh of the Hand cut off is covered, then any thing diverse and different from it? But although that the Conjoyning and Conglutination of the Disjoyned parts be the work of Nature alone; yet nevertheless, that Nature may the more easily effect this, the Physitian comes in for her assistance, by administring certain Medicaments both External, and Internal. The External are *Sarcotick*, or such as *Generate Flesh*; and *Kolletick*, or such as *Agglutinate*: Touching which we have already treated more at large, in the 5. *Book* of our *Institut.* *Part* 1. *Sect.* 1. *Chap.* 9. But although (as there we have shewn you) they may be propounded as divers; yet notwithstanding, seeing that the Conjunction of the wounded parts is wrought by means of the Flesh; the same Medicament (as is there said) according to the diversity of Bodies, and difference of the wounded parts, is somtimes *Sarcotick*, somtimes *Agglutinative*, and somtimes likewise *Epulotick*, to wit, such as generateth a Cicatrice.

Sarcoticks. But now, let us see and consider, by what power and virtue those Medicaments do afford any benefit in the curing of Wounds. *Galen* in his *third B.* of the *Meth.* of *Physick*, and 4. *Chap* is very large and ful in treating of this subject; and there he teacheth us, that there are two kind of Excrements produced in our Bodies; the one more thin; which for the most part is Evacuated by insensible Transpiration, and somtimes likewise by sweat: the other more thick, that sticketh externally unto the Body, and such as we term Filth and Nastiness. And so, that which is more thick, if it stick in the Ulcer is wont to make it sordid and filthy; but that which is thin maketh the Ulcer over moist, and so becometh an Impediment unto Nature in her generating of Flesh: and therefore (as he tels us) the filth and impurities are to be cleansed away, and the humidity to be dried up: and so, that those Medicaments are Sarcoticks, that moderately heat and dry, and cleanse away those impurities without any biting, and are no waies Astringent: and that the end of Sarcotick and Agglutinating Medicaments is, not to permit any humidity at all to breed between the parts that are to be Joyned; as the same *Galen* teacheth in his *second B. of the Composit. of Medicam. according to the kinds*, *Chap.* 21. And that they ought not to be Astringent, lest that they should drive back that which floweth in, and stuff in those impurities into the part affected: and that they must not be over drying, lest that they consume that that floweth in; but only moderately drying, that what floweth unto the part may grow together into flesh. And this indeed is almost the common Opinion touching Sarcotick and Unlnerary Medicaments.

But some of the latter Physitians tel us that this is better performed by a Balsamick virtue (from whence likewise they cal certain Liniments that are administred for the Curing of Wounds, Uulnerary Balsams:) But what this virtue is, they do not sufficiently explain: which if it be rightly explained, this Opinion will not then seem much absurd. For *Galen* teacheth us, (and so likewise other Physitians very frequently) that the Chirurgeons pains must in this most especially be imployed, that the temperament of the wounded part may be preserved. For since that the Agglutination of the Wounded parts is Natures work; and that Nature, in this, as in all other Natural actions, useth as her instrument the innate heat and temperament of the part; if that be as it ought, and if it be vigorous and strong, then the Curing of the Wound is happily performed; and by the benefit of this Native heat it hath been oftentimes known that many have recovered of the most dangerous wounds. But if the temperament of the part be vitiated, and the part become weak, Nature can then neither rightly concoct the Aliment that floweth thereto, neither Assimilate it, nor expel the Excrements; from whence it cometh to pass, that there happeneth a conflux of Humors unto the part affected, that there is an extraordinary heaping up of Excrements in the part, and from thence many Evils and Symptoms are attracted. Whereupon *Hippocrates* (in his *B. of Wounds*) writeth, that *what is dry cometh the more nigh unto that that is sound*; and that *by how much the more moist any thing is the neerer it cometh unto that that is vitiated, and not sound.* And therefore it seemeth unto me very probable, that Medicaments *Sarcotick*, and Agglutinative, and in a word, all vulnerary Medicaments, do indeed dry; and yet notwithstanding that this is not the only and primary operation they have; since that

that many Wounds (if so be the temperament of the part be safe) may likewise be Cured without the help and assistance of these like Medicaments; and Nature of her self expelleth those Excrements that are produced in a due and mean quantity. But it seemeth probable unto me, that those Medicaments are therefore profitable and expedient in the curing of Wounds, in regard that they do not only dry, and consume the over great store of Humidity in the Wound; but in that they likewise preserve both the temperament, and the innate heat of the parts (which some of the latter Physitians cal Balsam) by their virtue, neerly allied and familiar unto every part; which virtue they semblably term Balsamick. And hence therefore it is, that because there is not the same temperament in al the parts, and that there is a Native heat proper unto each part, therefore the same vulnerary Medicaments are not fit and proper unto all wounded parts; but some are convenient for a fleshy part, others for a Nervous part that is wounded; like as *Gum Elemi* is useful for all the Nervous parts; and therefore also most fit and convenient in all Wounds of the Head, as oftentimes before we have told you.

And I am the rather likewise perswaded hereunto, even by this, that in Wounds (especially of the Joynts, where dangerous Symptoms appear to be neer at Hand) our more skilful Chirurgeons do not content themselves only with Unguents and Emplasters, but upon those also they impose Cataplasms with very happy success; the which in regard they do not reach unto the Wound it self, they cannot therefore throughly dry up the Excrements that are therein; but they only cherish and preserve the Temperament and Native heat of the part. And I have oftentimes seen in Wounds of the Nerves, (in which by Reason of the weakned Temperament of the part there hath been an afflux of Humors, and in which by reason of the imperfect Concoction of the Aliment thereunto flowing great abundance of Excrements have been stored up, the German Chirurgeons cal them *das Glied Vvasser*) that by the use of such Cataplasms the Wound hath been reduced unto a better State, and hath no longer voided forth so great an abundance of Excrements. Now those Cataplasms are prepared and made up of the *Roots of Marsh-Mallows, the Meal of Lin-seed, Fenugreek, Beans, the powder of the flowers of Camomile, Melilote, Betony*, and the like.

And yet notwithstanding, from this that we have said (to wit, that the main and chief scope of Vulnerary Medicaments is to preserve and strengthen the Native heat of the part,) it doth no waies follow, that by one Medicament the Wounds of all parts may be healed. But like as *Galen* (in regard of the dryness, which chiefly belongeth thereto) according to the various Temperament of the various parts administreth various and different drying Medicaments; so likewise according to the variety of the Temperament, the temper and heat of each singular part requireth divers Medicaments; so indeed, that what is fit and proper for one part may be hurtful unto another; and that which is proper and useful for a fleshy part may bring much damage unto a Nervous part. For the fleshy parts are endued with much heat; and therefore albeit those things they are Cherished with be not so very hot, yet nevertheless they have strength enough. But as for those parts that are bloodless, their heat is much weaker, and therefore they are to be cherished with such things as are more hot, and then more especially when they are much weakened with a wound. Yea it may so happen, that although in their first Qualities some Medicaments may seem alike; yet notwithstanding in regard of their substance (by reason of which some of them do sooner lose their strength and virtue, and others preserve it a longer time) they may much differ; Yea they may differ in their whole substance, and hidden property. Now that an instance may be given of such Medicaments *Galen* assureth us, in his *Composition of Medicaments according to the place affected*, and 1 *Chap.* where he inveigheth against such as deny that there are such Medicaments. But a Reason cannot easily be rendered for such Medicaments; only experience teacheth us, that some of them are more useful and efficacious in the curing of wounds, then other, and especially in the Wounds of these or those parts;) although that in their first Qualities they differ but very little. In the mean time I am of Opinion, that the manifest Qualities in such Medicaments that work at once from their whole substance are not altogether idle and useless; but that they are singularly useful for the drying up of that excessive humidity that is in the Wound. And as there are Medicaments which in the propriety of their whol substance are accommodated unto certain Particular parts, (as some to the Liver, others to the Brain, and a third sort unto the Lungs) so likewise it is not absurd to say, that there are some Vulnerary Medicaments that are peculiarly designed unto certain parts; some to the flesh, others to the Nerves, and a third sort to the Brain, &c. And most certain it is, (as experience also makes it manifest) that *Gum Elemi* is singularly useful in Wounds of all the Nervous parts, as

also

also for the Brain; and *Betony* for the head, so that it is a thing of much concernment that in the administring of vulnerary medicaments we make a due and fit choice: and not only so, but the Nature of the sick person is likewise seriously to be weighed; since that even experience tells us, that in wounds some certain Medicaments are more useful for some Natures, and again, that some other are hurtful. And this indeed is chiefly to be discovered by experience, (if not only by experience:) and what *Galen* (in his third *Book* of the *Meth.* of *Physick*, *Chap.* 8.) writeth touching exsicating Medicaments, the same is also true concerning all Vulnerary Medicaments, to wit, that due respect is to be had unto the excrements, and the state of the Wound. For if there be but few excrements generated in the Wound, and that the Wound be otherwise in a good condition, this is an evident sign and token of the excellency and usefulness of the Medicament thereunto applyed; whereas on the other side, if there be many excrements heaped up in the Wound, it is an evidence that the Medicament administred was unfit and improper. In the mean time, neither are the manifest qualities to be neglected; but I conceive that of them likewise we are to make a due and fit choice, according to the temperament of the whol body, and the part affected in particular. Neither are we in this to neglect, but carefully to heed the constitution of the Air; but in the hotter seasons the medicaments may be the cooler; and the cooler the season the hotter ought the medicaments to be that we make use of.

Vulnerary Medicaments.

Now the vulnerary Medicaments (both Sarcotick, and Agglutinating) are provided, and made of the Roots of the greater Consound, *Bistort*, *Tormentil*, *the leaves of Ladies Mantle*, *Shepherds pouch*, *Golden rod*, *Balsam apple*, *vervain*, *Speedwel*, *St. Johns Wort*, *Milefoil*, *Sanicle*, *Horsetayl*, *Elm*, *Plantaine*, *Betony*, *Cypress*, *Mouseare*; *the flowers of Red Roses*, *St. Johns Wort*, *Pomgranates*; *Cypress Nuts*; *Frankincense*, *Aloes*, *Mastick*, *the tears* (*or sweat*) *of the fir tree*, *Rosin Turpentine*, *Rosin of the pine*, *and of the Larch tree*, *dry Pitch*, *the liquor of the smal leaves of the Elm tree*, *Gum Elemy*, *Gum Junip. Gum Hederæ*, *Tragacanth*, *Tacamahaca the Gum Caranna*, *Sarcocol*, *Dragons Blood*; *Sealed Earth Bole Armenick*; *the Rinds of the Frankincense Tree*, *the stone Hematites*, *and Coralls*. Of which there are made divers compositions, Liniments, & unguents. The Chiefest of these Liniments is that of *Francisc. Arcæus*; viz.

Liniments, and unguents.

Take *Clear Turpentine, and Gum Elemi, of each one ounce and half; the fat of a Gelt, two ounces; Old Hogs Grease, one ounce; let them melt at the fire, and make a Liniment.* Or,

Take *Rosin, Wax, Turpentine, Oyl of Roses, of each two ounces; Frankincense, Mastick, Myrrh, of each two drams; Make an Unguent.* Or.

Take *Turpentine two ounces, White Rosin, Olibanum, Colophony, of each two ounces and half; Mastick one ounce, Saffron one dram; Wax half a pound; Common Oyl one pound and half; Make hereof an unguent according to Art.* Or,

Take *the Juice new drawn of Ladies Mantle, of Sanicle, of Saracen Consound, of each alike, as much as you think good; set them to the fire, and then add, of old Swines fat, and May Butter, of each alike as much as will suffice, and make an Unguent.* Or,

Take *White Rosin three ounces, May Butter six ounces, Juice of Ladies Mantile one ounce, Sanicle Wintergreen, of each an ounce and half, Goats beard, , Oyl of Olive, of each two ounces. Let the Juices be first boyled with the Oyl until the moisture be consumed, then add the Rosin, and after that the Butter: then let them be strained, and stirred well together until they be cold.* Or.

Take *the Herb Wintergreen, Adders tongue Sanicle, Speedwell, of each one ounce; flowers of St. Johns Wort, and Centaury the less, of each six drams: let them be cut very smal, and shut up in a Glass bottle. Add Oyl Olive one ounce, the fat of a Hog three ounces, unsalted Butter four ounces; let them stand in a hot place, or in Balneo Mariæ, for eight days; afterwards boyl them till the humidity be consumed, and then strain them; after this add Turpentine one ounce, Mastick, Frankincense, & Myrrh, of each half an ounce, Aloes Hepatick one ounce, and make an unguent.*

The Unguent likewise of *Cæsar Magatus* is very useful; As,

Take *our Oyl of St. Johns Wort one pound, Wax washed in Balsam water three ounces. Let them melt together in a narrow mouthed Glass vessell; when they are melted, ad unto them of our Balsam one pound, Gum Elemi three ounces; Balsam of Peru, Tacamahaca, Caranna, of each two ounces, (all these Gums are to be dissolved severally and apart with our oyl of St. Johns Wort) Ammoniacum and Galbanum in like manner dissolved, of each half an ounce; Myrrh, Frankincense, Aloes, Gum hedera, of each two drams; the Roots of Consound, Birthwort, Bistort, and Tormentil, of each one dram and half, Cretan Dittany three drams, Water Germander two drams, Mans*

fat prepared two ounces; Swans fat, one ounce; mingle them, and make an Unguent; and keep it carefully in a narrow mouthed vessel of Glass or Silver.

Balsams. | *Oyls and Balsams: natural, as the Balsam of Tolu, of Peru, and the like; and Artificial; as,*

Take *Oyl of Bayes two ounces; Mastick, Olibanum, Goats sewet, of each one ounce, and Mingle them.* or,

Take *the yellow that is in the middle of red and white Roses, and white Lilyes, of each as much as will suffice; pour in unto them Oyl Olive a sufficient quantity; and then set them in the Sun (in a Glass close stopped) for fourteen daies.* or,

Take *Turpentine, and Oyl of Bayes, of each four ounces, the Oyl of the yelks of Eggs, two ounces; Oyl of Roses half a pound; mingle them, and set them in the Sun, until they shall have gotten a yellowish colour.* or,

Take *Turpentine one pound; Galbanum, Gum Elemi, Gum Hedera, Frankincense, Mastick, Myrrh, of each two ounces; Aloes, Xyloaloes, Galangal, Cloves, Cinamom, Nutmeg, Cubebs, of each one ounce, Aqua vitæ three ounces. Let them be macerated together for a day and a night, and afterward let them be twice destilled; and keep that destilled oyl as a pretious Balsam.* Or,

Take *the Liquor of the bladders of the Elm defecated and prepared, one pint; the best hony purified three ounces, Juice of Tormentil, of the greater Consound, and of the mean Consound of each four ounces; mingle them, & boyl them over a gentle fire to the consumption of the Juices; and then ad the following powders.*

Take *Dragons Blood, Oriental Bole-armenick, Manna thuris, Horse Tayl, Mastick, of each two drams: Mingle them, and make a very fine pouder, and ad it unto those things above mentioned.*

The preparation of the liquor of the Elm-bladders is thus; in the moneth of *May* these kind of bladders are to be gathered, before there breed any Worms in them; and with this liquor a glass vial is to be filled up, and stopt with a linen cloth: after this a hole is to be made in the earth, two or three hand breadths in heigth; and in the bottom of the hole we are to put common salt three fingers high; upon which the vial is to be placed; and then the hole to be filled up with earth, so that the vial appear not; and so it is to stand for twenty five daies: then the dreggs are to be separated from the cleer substance; and that which is cleer is to be kept for use; which if you put of it self alone unto the disjoyned parts, it agglutinateth them.

Another Balsam.

Take *Frankincense, Myrrh, Sarcocol, Gum Junip. Gum Arabick, Gum hedera, Gum Elemi, Mastick, Dragons blood, Balsam of Peru, Tacamahaca, Caranna, of each one ounce and half. The tears or sweat of the Fir tree, the liquor of the little leaves of the Elm, of each one pinte; Rosin of the pine, half a pound; Tormentil roots, Roots of Bistort, of Orace, Birthwort, Consound, white Dittany, of each half an ounce; Juniper berries, and Bay berries of each six drams; spirit of the best wine, three pints; mingle them together, and destill them, and receive the water, the spirit, and the oyl, severally and apart; All of them are excellent good for the agglutinating of any Wound.*

Another Balsam.

Take *the oldest oyl you can get, four ounces; Venice Turpentine ten ounces and half, whol Wheat two ounces, St. Johns Wort two ounces and half, the roots of Carduus Benedict. and valerian, of each ten drams; the finest smal dust or pouder of Frankincense, two ounces; Hypocistis (or the excrescence of Cystus) half a dram; Bolearmenick and Dragons blood, of each half an ounce, the pouder of Earth-Worms two drams, the greater Consound one handful, Horse Tail half a handful; let the roots and herbs be bruised after a gross manner, and then put up into a vessel; and then pour in white Wine unto them; and after they shall for a while be thus infused, let the oyl and the wheat be added, and all boyled unto the consumption of the Wine. After this pressing and squeezing forth the Liquor with al your strength, ad the powders and the Turpentine, and then suffer it again to boyl a little, and so keep it in a Glass vessel for your use.* Or,

Take *Turpentine two pound, Common oyl three pints, Oyl of Bayes six ounces, Oyl of Cinnamom, two ounces; Oyl of Euphorbium, oyl of Cloves, and oyl of Bay berryes, Gum hedera, Ammoniacum, Sagapenum, Opopanax, Galbanum, of each one ounce; Frankincense, Mastick, of each two drams; Let them be together destilled; and make a Balsam for the Wounds of Nerves.* or,

Take *Clear Turpentine two pound, oyl of Linseed one pint, Rosin of the Pine six ounces, Frankincense, Myrrh, Aloes, Mastick, Sarcocol, of each three ounces; Mace, Ligne Aloes, of each two ounces; Saffron half an ounce: put al these into a Retort, and first of al let them be destilled by a gentle fire, and there wil come forth a cleer water; and a little after there wil follow a reddish oyl; then augment the fire, ever and anon more and more increasing it, unto the end of the destillation. This being done, separate the oyl from the Water, and keep them both assunder. This water in a short time will become of a reddish colour, and the oyl wil be of the color of a Rubie. This oyl is exceeding good*

good for Wounds, but especially the Wounds of the Nervous parts, of the bones, and of the Veins: for it Consolidates speedily, and without pain. Another,

Take *Earth-worms as many of them as you think fit: put them into a Vessel filled up with the Moss of the wild Sloe-Tree, to the end that creeping through the Moss they may be purged from their filth: add likewise unto them the yelks of Eggs hard boyled, and sliced, that they may serve them for food. Of these Earth-worms thus prepared, take one pound, and let them be well bruised in a Mortar; and then add Oyl of Roses one pinte, boyl them, and afterwards strain them; and unto the straining add of Mastick and Myrrh, of each two drams, the Root of Orace and Sarcocol, of each six drams; Turpentine, and Honey of Roses, an ounce and half; Mingle them.* Or,

Take *Oyl of Olives, one pinte; Turpentine, three ounces; flowers of* St. *Johns-wort, Mullein, of each a sufficient quantity, that there may be a Masse made: unto which pour of the best white Wine, a measure and a half; and boyl them til the Wine be consumed. Let the species be afterwards put in the Sun for two months, that so there may be made an Oyl or a Balsam.* Or,

Take Roots of the greater Confound, as much as you please thereof; put them in a new Pot, and pour in of the Oyl of Olives unto a good heighth; boyl them, and press forth the Liquor; the Juyce thus pressed forth, boyl it again so long, until there be none of the Waterinesse left remaining, and then afterwards,

Take *Of this Oyl, three parts; Oyl of Turpentine, one part; Flowers of* St. *John wort, and of the greater Celandine, of each as much as will suffice: let them be mingled and melted together, and so put into a Glass Flagon; and so let them stand for fourty daies in horse dung, and then you shall have a Balsam, which you are to instill Warm into the Wound.* Or,

Take *Oyl Olive, a pinte and half;* St. *John-wort, Betony, Prunella or Self-heal, Centaury, of each one handful; let the Herbs be bruised together, and with the Oyl let them be shut up in the Glass Vessel; and then set them in the heat of the Sun, for the space of fourty daies, there to digest; and afterwards press forth the liquor; which you may reserve for use.*

The following Oyl (as *Hieronymus Fabricius* tels us) is in *Spain* very much commended, for all Wounds of the Nervous parts.

Take *Of the oldest Oyl, three ounces; pure Turpentine eight ounces, whole Wheat, one ounce and half; Seed of* St. *Johns wort, two ounces; Roots of Carduus Benedict. and Valerian, of each one ounce; Frankincense powdered two ounces; let the Roots and Herbs be bruised in a gross manner, and put into a Pot; and then pour in so much white Wine that all may swim in the Wine, or at least be covered therwith; and after two daies infusing, let the Oyl and the Wheat be added; and then boyl them all until the wine be wasted away; and presently after having first strongly pressed forth the Liquor, add the Turpentine and Frankincense; then let them be again a little boyled; and kept for use in a Glass Vessel.* The manner of using it is thus. The Wound being first washed with cold white Wine, the whole Wound is then forthwith to be anoynted with the Oyl aforesaid a little warm; but if this cannot conveniently be done, it is then with a Pipe or Funnel to be conveied within the Wound; and immediatly the Lips of the Wound are to be brought together so close that they may touch, either by a Ligature, or by sewing, or by Gluing. And then the parts that lie round about are likewise to be anointed with the aforesaid Oyl. Upon the Lips of the Wound now drawn together you are to lay on a Linen Cloth wet in the aforesaid Oyl: and above upon this another wet in black Wine, and then wrung dry, and then upon this another dry Linen Cloth; and then Lastly, upon al the Swathe is to be rolled about, and fastened.

The Oyl of Hispana.

That Oyl likewise which they cal the Oyl of *Hispana* is much commended; and it is thus to be prepared, and made.

Take *Old Oyl of Olive four pound, Oyl of Turpentine, two pound; Frankincense one pound, Valerian,* St. *Johns-wort, Carduus Benedict. of each half a pound; Elect and Choice Myrrh, one ounce; Cutchioneal, four ounces; new Rosin of the Pine, three ounces; Malmesey three pintes.*

Let the Valerian be gathered in the month of *May*, and cast away the Roots. The St. Johns-wort may be gathered in the month of *July*, with the Flowers and Seeds. The Herbs therefore being broken with the Hands, and a little bruised in a Mortar, let them be infused in the Malmsey and put into an Earthen Pot covered over with Glass; of which said Pot let the third part remain empty of all those things aforesaid that are put into it, for four hours. In the next place let the Cutcheoneal (a little broken in a Mortar) together with the Oyl, be put upon the rest; and so without any Covering let them boyl by a gentle Fire, until the Wine be well nigh wasted; and here great care must be taken, that the Herbs be not burnt in the boyling. After this let it be taken from the fire, and while it is yet scalding hot let the Herbs be pressed and squeezed very hard in a bag first

soaked in Malmsey. And then let the Vessel in which the boyling was be carefully cleaned; (and yet nevertheless it will not be altogether dried, for there will still be left some of the Wine sticking to the sides) and in the same Vessel let the Oyl be again put to the Fire, with the Oyl of Turpentine, or that that sweats forth of the Fir-Tree; and so soon as ever it begins to boyl, let the Mirrh bruised and beaten very smal be added, and melted in a Mortar with a little of the Oyl that is in the Vessel over the Fire. Let Rosin in like manner be added, melted with the same Oyl; yet nevertheless it must be first strained through a strainer; and then add the Frankincense being very finely powdered; &; let al the other things be in the most exact and curious manner mingled together; and when they have boyled a little, let the Vessel be taken from the Fire; and when they are grown cold, let it be kept in a Glass Vessel, without any straining at al; and so let it be set abroad in the Sun, for fifteen or twenty daies.

The Oyl of St. Johns-wort, invented by Magatus.

Cæsar Magatus commendeth likewise the Oyl of St. Johns-wort, of his own invention; which is thus with much labor and pains to be made.

Take *the Tops of St. Johns-wort, three handfuls; Adders Tongue, the greater Consound, and Horse-Tail, of each one handful; white Wine well scented and strong, five pints; let the Herbs be bruised and macerated in the said Wine for the space of twenty four hours, the mouth of the Vessel being carefully and close stopt: and then making an expression, and straining what is so pressed forth, take the like Quantity of the said Herbs, and let there be a second infusion, and after that a third. The last infusion being made, and the liquor pressed forth and strained,* Add then unto the white Wine,

Of old Oyl six pound; the Tops of St. Johns-wort, two handfuls, Adders Tongue, the Herb commonly called Meddow-sweet, or Regina prati, the greater Consound and Carduus Benedict. of each one handful, the Root of white Dittany, the greater Consound, Birth-wort, Tormentile, Bistort, of each half an ounce; Scarlet Grain or Chermes Berry, two drams; Seeds of St. Johns-wort, six drams; and mingle them. Having bruised those things that are to be bruised, let them be macerated in Balneo in hot boyling water, the mouth of the Vessel being well stopt, for twenty four hours; and afterwards let them boyl in a double Vessel, tel the Wine be consumed; and then pressing and wringing forth the Liquor, and straining it through a bag first well moistned in the best white Wine, Add thereunto.

The Tops St. Johns-wort, two handfuls; Adders Tongue, the Herb Meddow-sweet, Consound, Woodroof, (which the Latine Herbarists call Matrisylva) *of each one handful; mingle them. The Herbs being bruised, and an infusion made in a Bath of scalding hot Water, or in Balneo Mariæ, for twenty four hours; and after this an expression being made, and the Liquor strained, (as before,) take the like quantity of the aforesaid Herbs, and make another infusion, as above; and so a third: and the last expression and straining being made, add to the Oyl, Leaves of St. Johns-wort, two handfuls; Betony, Pimpernel, Mous-Ear, the Herb Trinity, of each one Handful; of these make three infusions, as above; the last expression being made, and the liquor strained,* Add unto the Oyl,

Of the smalest Leaves of St. Johns-wort, two handfuls; Consound, the lesser Centaury, white Briony, Periwinkle, of each one handful; and here likewise let there be three infusions in this manner: Let the Vessel (which ought to be of Glass) be set in the Sun for three daies; and the fourth day let it be kept in a Balneum of Scalding hot Water, and there let it continue for twenty four hours; and afterwards make an expression, and strain it; and unto the Oyl let there again be added, The smal Leaves of St. Johns-wort that have attained unto their ful ripeness, three handfuls; Centaury the less, one handful; the fruit of the Balsam Tree, in Numb. 6. And then do as before. The last expression being made, and the straining likewise, Add unto the Oyl,

Dittany of Crete, one ounce; Roots of white Dittany, and the greater Consound, Birthwort, Orace of Illyria, Bistort, Tormentil, of each six drams; Scarlet Grain, two drams. Make three infusions after this manner: set the Vessel in the Sun for six daies, after that for two daies let it be kept in a Balneum of boyling hot water; then press forth the Liquor, and strain it: and thus do three times, (as above) and in the end, the last expression being made, and strained, Add unto the Oyl

The distilled Oyl of Turpentine, of the Gum or sweat of the Fir-Tree, of each half a pound; Seed of St. Johns-wort, one ounce; Root of Consound, Birthwort, white Dittany, Tormentil, Bistort, Orace, of each two ounces; Scarlet Grain, one ounce; Mirrh, and Frankincense, of each one ounce and half; Sarcocol, Gum Junip. Aloes, of each half an ounce; Apples of the Balsam Tree, twelve in Numb. Balsam of Peru, two ounces; slice the Apples, and bruise all the rest, mingling them with the Oyl; and let the Vessel be kept all the Winter time under Horse Dung; then take it forth, and press out the liquor, and straining it keep it for

your

your use in a Glass vessel, the mouth thereof being close stopt.

The vulnerary Balsam of *Magatus.*

The Vulnerary Balsam of Magatus.

Take *Gum Elemi four ounces; Balsam of Peru three ounces, Gum Tacamahaca, Gum Carranna, the liquor conteyned in the little bladders of the Elm, of each two ounces; oyl of Bayes, Styrax liquid, Myrrh, of each one ounce and half; White Frankincense, Gum Hedera, of each one ounce; the sweet smelling Laser, Ladanum, Styrax Calamite, (the fattest you can get) Ammoniacum, Bedellium, Opopanax, Galbanum, Sarcocoll, of each six drams; Roots of Birthwort, Master-wort, Angelica, White Dittany, Consound, Acorus, Orace, Tormentill, Bistort, the seeds of St. Johns Wort, of the Citron, Citron rind, of each half an ounce, Cinnamom, Cloves, Nutmegs, and Mace, of each one ounce; Mastick, Aloes, Dragons blood, Scarlet Grain, of each half an ounce; Cretan Dittany, one ounce; the oyl of the oyle Nut Ben, three ounces; Juniper Berries an ounce and half, Wax one ounce; Rosin of the Pine, one ounce and half; Cleer Turpentine, Gum of the fir tree, of each one pound and half; the best strong water, six pints;* Mingle them, the Gums being exactly melted; they may be melted apart by themselves, with some of the Turpentine, and the rest that are more drie beaten and bruised (in a gross manner) into a powder: and then let them all be cast together into a Retort, which may be kept for three days in a *Balneum* of Boyling hot water; then let it be luted and kept in the hot water, untill the Clay be throughly dryed; afterwards by a fire of Ashes or embers let the oyl be drawn forth in an Artificial manner; now first there will come forth a certain water, (which I call the water of Balsam, and it is to be kept by it self) and then the oyl, which we call Balsam.

The oyl of St. Johns Wort is here likewise of singular use; and it is thus to be prepared.

Oyl of St. Johns wort.

Take *the Tops of St. Johns wort fully ripe, three ounces; Macerate them for three days in sweet smelling Wine and then let them boyl in a double vessel, stopping close the mouth thereof; after this let them be squeezed hard and the liquor pressed forth: & then let a like weight of fresh St. Johns wort be cast into it; let it be again Macerated, boyled and pressed forth; let this be thrice done; and if the wine be diminished, add other instead thereof; after this,*

Take *Turpentine three ounces, old cleer oyl six ounces; Saffron one pound; boyl them in a double vessel unto the wasting away of the wine and then make an expression; and when you have purged the oyl from all its setling, reserve it for your use.*

The Balsam following is greatly commended by Dr. *Raimundus Mindererus.*

The Balsam of Mindererus.

Take *Turpentine of Cyprus, & oyl of St. Johns wort, of each as much as you think good; let them be melted together; melt likewise by it self of Gum Elemi a sufficient quantity, unto a Just consistence, and let it be added unto the rest. When they are almost cold, add a little of the destilled oyl of Wax, and Mingle them.*

Henricus ab Heer (*in his* Physical observations, Observat. 10.) *highly commendeth this Balsam;*

The Balsam of Henricus ab Heer for wounds and ulcers.

Take *the flowers of Thapsus or scorching fenel, St. Johns Wort, the leaves of Prunella or Selfheal, of each one handful; boyl them in the oyl of the seed of St. Johns wort pressed forth, and old red Wine, of each alike, untill the wine be altogether consumed, that is, untill that a drop of the liquor cast into the fire take the flame without any noyse at all; and so keep it for use. If you please, you may often macerate the same flowers, and after you have set them in the Sun for fourty daies, or kept them hot upon the fire, you may again press forth the liquor; which the oftener that you do it, the more efficacious you shall find the oyl; add if you think fit the Stone called Calaminaris, made hot, and quenched first seven times in wine; and then making it red hot, quench it in this oyl.*

And yet notwithstanding in the use of Balsams (especially if they be hot) there is great caution required, (as *Guilhelm. Fabricius* likewise acquaints us, in his *third cent. observat.* 97.) not only because that the lips of the wound being overfoon conglutinated, the *Pus* that is afterward generated is kept within, and so exciteth grievous symptoms; but likewise because that those kind of Balsams are not alike and equally convenient for the temperament of all the parts.

Emplasters.

The Emplaster of *Franciscus Arcæus* is of singular use. As,

Take *Oyl of Roses, of Violets, and of Camomile, of each one ounce; the soft fat of a Hen, the marrow of legges of Veal, of each half an ounce; Earthworms washed in Wine one ounce; New fresh butter six drams; the Mucillage of Marshmallows half a pound; Boyl them all unto the consumption of the mucillage, and then strain them; unto the straining add Litharge two ounces and half; vermilion three ounces; with a sufficient quantity of white wax make a Cerot; adding of Turpentine ten drams, Mastick half an ounce; or,*

Take

Take *the new drawn Juice of Betony, Agrimony, Sanicle, Ladies Mantle, Saracen consound, of each half an ounce; White wax and Goats sewet, of each half a pound; the best Rosin one pound; boyl them; and in the end add Mastick one ounce, and make an Emplaster. or*

Take *Wax, Rosin, Pitch, Vitriol, White Frankincense, of each four ounces; Turpentine six ounces; red Myrrh, oyl of Juniper, and oyl of Eggs, of each two drams; Camphire one dram and half; make an Emplaster, adding oyl of Roses as much as will suffice.* or,

Take *New Wax, and Rosin, of each one pound; Goats sewet, Hoggs fat, of each three ounces; Turpentine two ounces; Vinegar three ounces; and make an Emplaster.* or,

Take *Litharge of Silver. oyl of Roses, of each half a pound; Mucilage of Linseed, and of Orace Roots, of each two ounces; Boyl them unto a Just Consistence; and afterwards add Frankincense, and Mastick, of each one ounce; Wax and Turpentine, of each two ounces; and so make an Emplaster.* or,

Take *Wax three ounces; Rosin and Pitch, of each two ounces; of White Frankincense, Vitriol, Cerus, of each four ounces; oyl of Juniper berries, & oyl of Eggs, of each two ounces; Champhire a dram and half, Turpentine half a pound; Make an Emplaster.*

The following Emplasters are chiefly useful for Prickings.

Take Oyl Olive two ounces; Rosin, Bears fat, Goats sewet, and Bulls Sewet, of each one ounce and half; the fat of a Cow-heel, three ounces and half; May butter, six ounces; Litharge of Silver one pound; the scales of Brass one ounce and half; Mastick one ounce; New wax, or the oyl of the same four ounces; and make an Emplaster according to art.

Raimundus Mindererus likewise most highly commendeth his own Emplaster which he calleth Emplastrum opoteldoch *magnum Colcotharnum*; the description whereof, as we find it extant in his *Tract of Calcanthum, Chapt.* 7. is as followeth) of which he writeth that it is the best of al that are known for the healing of new wounds, and the drawing forth of things extraneous that are fixed in the wound; and so likewise in stinking and putrid ulcers. *Viz.*

Take of the newest and Cleanest Wax one pound; Cleer Turpentine, or (if you had rather) Cyprus or Venice Turpentine, six ounces; Gum Elemi three ounces; oyl of St. Johns wort, oyl of Myrrh of each one ounce and half; let them melt all together; and as so soon as they begin to run abroad, add unto them these things following; of the purest and cleanest Gum Ammoniack, Galbanum, Opopanax, of each three drams; Colophony six drams; Choice Mummy, white and transparent Amber, of each two drams; White Frankincense, Mastick purified, Dragons Blood, Sarcocol purged from its excrements, of each one dram and half; Aloes Hepatick half a dram; Myrrh one dram; let the Gums be dissolved in vinegar; and let them be joyned together in a fit manner, and according to art, stirring them ever and anon; and when they appear to be almost cold, then by degrees, & warily cast in of the Loadstone prepared six drams; Crocus Martis according to art prepared without a corrosive, and Tutty prepared, of each one ounce; Lapis Calaminaris prepared, five ounces; Litharage of Gold one ounce; Colcothar sweetened, or the Earth of Vitriol mortified and dulcified two ounces; let them be according to art reduced into an Emplaster, which when it is cold wil grow to be very hard.

The use thereof is thus; It is over live coals to be tampered with the fingers until it become soft; and then apart of it, is to be spread abroad like a Cake, and with it the wound is to be covered al over; and dayly let it be twice again wiped and made clean, and Malaxed, and so again let it be put upon the Wound; and thus with one smal part thereof more wounds then one may be healed.

Epuloticks. And then in the Conclusion, the wound is to be shut up with a Cicatrice: but in what manner the sayd Cicatrice is to be brought over the Wound we have shewn you before, in the second part, about the end thereof: and Certain Playsters likewise made of those things that we but even now mentioned may also bring a Cicatrice over the Wound; when they have first throughly healed the same.

Very useful also are those Emplasters that are commended by *Franciscus Arcæus*, (in his second Book, and fifth Chapter) to wit, the Leonine Emplaster, and the black. The Leonine is thus described.

Take Cerus three ounces; oyl of Roses half a pound; the Basilique Unguent one ounce; let them boyl together over a gentle fire stirring them all the while with a spatter of wood, even untill that a Cerote may be made, unto which ad of Verdigrease powdered three drams; then let them boyl again, until they shal have gotten a colour yellow, or somewhat reddish: and then make a Cerote. Of the black Emplaster this is the description.

Take Litharge one pound, old oyl and the strongest Vinegar, of each three pints; Mingle them over the fire, and make an Emplaster.

CHAP.

Chap. 9. *My Judgment, touching the Method of* Cæsar Magatus, *and* Ludovicus Septalius, *in their Curing of Wounds.*

AND thus, out of what hath hitherunto been said, it may plainly appear in what manner Wounds are first of all to be bound up; and what ought to be the first provision and preparation that we make for the Curing of the same. But how and in what manner we are further to order and handle them, I am now to acquaint you. For in very truth, the Ancients who have written of the Curing of Wounds, as also the Chirurgeons who have handled and healed them, do not at all differ in those things that are further to be done as touching the same, (as we shall presently shew you) but they all of them go almost one and the same way. And first of all some years since, *Cæsar Magatus*, Professor of Physick in the University of *Ferrara*, (in his *two B. of a rare kinde of healing of Wounds*, in the which he hath with much diligence and accuratenes treated of all things whatsoever that may possibly be said of Wounds) promiseth us a new Method of Curing Wounds; such as hath not hitherunto been attempted by any; and by which the said wounds may more speedily and happily be Cured, then they have been formerly by the Ancients, or hitherto by any whomsoever. *Ludovicus Septalius* extolleth and defendeth *Cæsar Magatus*, in his 8. *B. of Physick Observations, and Animadversions.* There is due unto both these their deserved praise, in regard of their study and endeavour to advance the Art and Practise of Physick, and to free the sick from their Diseases, and the long and troublesom way of Curing the same. And yet notwithstanding I conceive that I shal not in the least offend against the Publick, or the Private good of any, if I shall here in this place, without any detraction, set before you the Opinion of them both, and accordingly weigh them, and tell you my Opinion therein.

And first of all, *Cæsar Magatus* (in his 1 *B. of Wounds*, and 33. *Chap.*) accuseth *Galen* for having forgotten and omitted an Indication of the greatest moment, and for being wholly taken up with other things that are of far less moment; and there he writeth, that *Galen* was sollicitous, and troubled himself only with the Excrements that were bred; but as for the Cause from whence they are generated, he never so much as minded the same: and that he seemed to desire and require the wasting of the said Excrements, but then that he took no care at all to prevent the generating of them; to wit, in a word, that he was but little careful as touching the temperament and heat of the part. For if sufficient care be taken for the Temperament and strength of the part; he thinks that then there could not possibly be collected such great store of Excrements that might require this over curious, and indeed hurtful diligence. Now he thinketh that the heat may be sufficiently Cherished and Corroborated, if we prevent and hinder the diffusing thereof abroad, and that we preserve its quality: and that the diffusion thereof may be prevented, if we supply the want of that Natural Covering (such as is the wounded Skin) and this indeed by a Medicament that in its quality comes neer, and is a friend unto the temperament of the part. For so both the heat is cherished, and the quality thereof preserved by a Quality that is like unto it. And from all these premises he concludeth at length, that Wounds are to be more seldom wiped and cleansed then hath formerly been practised; to wit, lest that the heat of the part be hurt by the Ambient Air; but that it ought to be preserved safe under a continual Covering, and so Cherished and augmented; and thereupon he propoundeth a new way of Curing Wounds; touching which we shall now speak somthing. And indeed what we have already said is the sum and substance of the whol matter: but yet Nevertheless in regard that the Authors now mentioned do treat so largely touching the thing now in question, we shall explain it a little more cleerly.

Now the State of the Controversie is this; to wit, whether it be better once (if not twice) a day to uncover and cleanse the Wound; and laying on new Medicaments again to bind it up; or else indeed not to do this above once in seven daies at most. All the Ancient Physitians and Chirurgeons (unto these very times) have followed and practised the former way of Curing Wounds. And as for this latter way of Curing them, *Cæsar Magatus* (in the preface to his first B. of Wounds) tels us that he first of all saw it at *Rome*, which although that at the first he suspected it, and that it seemed unto him to rest and relie upon a weak and infirm Foundation, and to have no very good reason for it; yet nevertheless, that observing daily the rare and wonderful Events thereof, he began with himself strictly and accurately to examine and search into those Foundations and Grounds upon which it rested and relied. And there he writeth that in two things especially he found this new way of Curing

Wounds

Wounds to differ from the former common way. The first this, that the Wounds were very seldom opened: the other was this, that in this new way there was no use at all made of Tents and Liniments: of both these we shall now Treat, and speak of them severally.

Whether Wounds be often, or but seldom to be Cleansed?

Magatus and Septalius their way of Curing Wounds.

We will yet notwithstanding first of all propound and set before you their way of Curing Wounds. If a Wound be to be Cured, that is in a Body otherwise sound and of a good habit, and healthful Constitution, (in which there is neither any great Vessel, nor yet any Nerve hurt; but that it is simply in the Flesh; and that there hath flown forth sufficient of the Blood) they then command the Lips of the Wound to be Joyned together, so as that they touch one the other. The Lips being united and brought to touch, they then impose somthing upon the Wound that covereth it and so cherisheth the Native heat, and withal hath a power and virtue to dry, with some kind of Astriction; to the end that so the Blood that floweth unto the part that is wounded (for its nourishment) may be throughly purged from al its superfluous humidity, and brought unto a certain viscidity or Clamminess. And for this purpose, they administer Rosin Turpentine, or Rosin of the Fir-Tree; unto which (if they be more solid) they add a certain portion of Wax, that it may acquire a Consistence. They commend likewise for this end Tacamahaca, which that it may the more easily be spread, they soften it with the Oyl of the Male Balsam Apple, or of St. Johns-wort, a fourth or fifth part thereof. They commend also the Balsam of Peru unto which (if it be more solid) they give a Consistence by adding of Wax. They use likewise the Juyce that is contained in the smal Leaves of the Elm, thickned; as also the Cerote Barbarous (as they cal it) the Cerote Diapalma, and the Cerote of Betony with Tacamahaca: or some other Emplaster made of the Juyces or Decoctions of Vulnerary Plants; adding thereto, Aloes, Sarcocol, Dragons blood, Rosin Turpentine, and Rosin of the Fir-Tree. Of these Medicaments they spread somwhat thereof upon a Linen Cloth that may answer the greatness of the Wound, and may likewise take in somwhat of the adjacent parts; and this they impose upon the Wound. And then upon this they apply as many linen Clothes doubled or trebled, as are sufficient for the preserving of the Natural heat of the part, and the keeping off the injuries of the Ambient Air. And the Wound being after this manner bound up, they open it not until the fourth, fifth, or sometimes even the seventh day; and so (as they write) a wound (such as it may be) is now and then Cured with once binding up; and that very frequently two or three dressings do suffice. And yet notwithstanding, that the Linen when it is all foul and nasty may sometimes be taken off, and clean Clothes be imposed in stead thereof, this they allow of; provided alwaies, that this be done without any uncovering of the Wound. And withal they likewise make exceptions in some certain Cases, in which this way of Curing simply hath not place, (but that we ought in those Cases to use the old way of Curing) touching which we shall anon speak further.

Whether Wounds be often, or but seldom to be opened?

And that new way of Curing they prefer far before the former old manner; and first of al they endeavour to prove by certain Arguments and Reasons, that it is both more easie, and more safe: and then by certain Reasons they impugne and oppose that Ancient way; and then Thirdly, they endeavour to weaken and invalidate those Causes that are alleadged by the Ancients, and whereby they seem to be drawn unto the more frequent opening and uncovering of the Wound; and then lastly, they attempt the answering of whatsoever hath been by any objected against this new way of theirs: unto all which we shall speak in order.

And in the first place therefore, that this their new way and Method is both more easie, and more safe also, (and by which far many more have been and may be Cured, then by the old common way) they first of al appeal unto experience: and in special, *Ludovicus Septalius* writeth, touching the Wounds of the Head; that when in a time of great weakness and sickliness at *Millain*, in the space of one year very many of those that were wounded in the Head, and were ordered after the old wonted manner (to wit, by often opening of the Wounds, Tents, Liniments, and more frequent Terebrations, and Scrapings) miscarried and perished: and that afterwards this new way of curing being put in practise, to wit, by imposing an Unguent upon the Wound, anointing the Lips thereof with the Oyl of the Fir-Tree, and the wound only twice or thrice uncovered, and but one only Terebration (or piercing with the Wimble) being instituted, of fourteen that were wounded in their Heads there died but only one of them. And *Cæsar Magatus* (in his

1. *B.* and 40. *Chap.*) writeth, that the wounds inflicted upon the Head (with the falling in of the bone) within the space of twenty daies were perfectly cured in that manner. And likewise that in the same manner, and in the same space of time a wound of the head, with a cutting of the Membranes, was healed. And that a Wound inflicted on the Head with a Leaden bullet shot out of an Engine of War (so that the bullet pierced even to the more inward parts of the Brain before, neither could be found, or drawn forth) in thirty daies, after two or three openings and dressings was perfectly Cured.

I. And then in the next place, *Cæsar Magatus* (in his 1. *Book Chap.* 7.) alleadgeth these Reasons, which we will briefly propound.

The Reasons that moved Magatus *to prefer his new way of Curing wounds before the old.*

The First is, that this new way of Curing wounds doth best and with the most security perform all those things that are required in Curing. To wit, as for the Native heat, that Nature useth (for suppuration, generating of Flesh, and the glutinating of the Wound) as its chief Agent, (and which by Reason of the effusion of Blood, and the uncovering and wounding of the Natural Covering is dissipated and rendered very weak, and by the external Air is offended and altered) is made more strong and vigorous, whereas in this new way and Method of Curing the Wounds are kept covered. For when the Wounds are but seldom uncovered, that Artificial Covering supplieth the defect of the Natural covering which is the Skin; and so neither the Native heat is scattered and dissolved, neither is it at al altered by the Ambient Air. And for this Reason *Septalius* wondereth that *Galen* should omit this main and principal scope, (which is to preserve the Native heat) and that his care and study is only to take away the Impediments.

And Secondly, He therefore thinketh that Wounds are most happily cured in this new way of theirs, because that in this way those things that retarde and hinder the Curing of Wounds are sooneſt and best of all turned and taken out of the way. For whereas one main impediment (among all those other that chiefly hinder the speedy and safe curing of Wounds) is the confluxe of Humors unto the wounded part; they think that that impediment is by this their new way best of all prevented. For since that the afflux is caused either by transmission, or else by attraction (by Reason of the pain, and heat) both these are best turned away by this their new manner of curing. For if the Wound be but seldom opened, the heat is then by the covering preserved and fortifyed; neither is there any pain excited, as it is wont to happen by the frequent handling and cleansing of Wounds. For all those inconveniences and discommodities are avoided by this new way of curing, whilest that the part is but very rarely moved from its due and proper Scituation, is very seldom loosned and unbound, so that likewise there is not often occasion for its binding up; and (as he addeth in the 32. *Chap.*) if any winde or Humor distend the part, so that there be great pain caused thereby, it is speedily discussed by the strong and more Vigorous heat.

Thirdly, Of all those things that impede and withstand the Cure of Wounds, the chiefest of them is the exposing of the Wound unto the Ambient Air, by which the innate heat is altered and weakned. But now this is prevented, if the Wound be but seldom uncovered by opening thereof.

Fourthly, whereas *Hippocrates* (in his 2. *Sect. of Fractures, Title* 7.) commendeth that Cure under which there is little or no impostumation and loss of the bones, this appeareth to be so in this new way of curing; and therefore he determineth, that this is the most perfect: and this *Magatus* proveth by an example of his own; for that in this manner he had Cured Wounds of the Head (wherein there was likewise an extraordinary hurt of the bone, in so much that any one would have Judged that a great part thereof would have dropt out) without any impostumation and abscession of the bone, or any thing else.

Fifthly, He therefore thinketh that this new way of curing is to be preferred, because that under it fewer Excrements are generated then under the common and wonted manner, which (as he writeth) is manifest by experience.

Sixthly, *Cæsar Magatus* (in his first B. and 32. Chap.) bringeth this likewise for a Reason: because that those things that are extraneous and strangers to the Body, (and which at the first could not be drawn forth by the Chirurgeons, being such as require the work of Nature,) may more easily be driven forth, if the Wounds be but seldom uncovered; and that for this very Reason, to wit, because that in this new way and Method the Natural heat is more rightly preserved, cherished, and augmented; as was said before in the first Reason.

And Seventhly, in the place alleadged he produceth this for one of his Reasons; that in this his new way the virtue of the Medicament that was administred in the first dressing, is best of all continued and made to endure even unto the perfect agglutination of

the Wound; and especially if it be of such an essence that it cannot hastily be dissipated. And as for those Excrements that usually are here to be found, he thinketh also that it cannot be by them corrupted; since that the Excrements that are generated are not worth a speaking of.

II. They in like manner reject the Ancient Way and Method of Curing Wounds; as drawn thereunto both by experience and Reason. Experience indeed, because that (as is said before) under the Ancient way of Cure fewer Patients, and with far more difficulty, do recover of their Wounds, then under their new way. And as for the Reasons they alleadg, they are these.

The Reasons moving Magatus and Septalius to reject the Ancient way of Curing Wounds.

The First is this, because that under the ordinary and wonted way of curing, the wounded part is exposed unto the Ambient Air; and by it the Natural heat thereof may be dissolved, offended, and weakned; and that thereupon the part is rendered the more apt and Obnoxious unto a reception of the Afflux of Humors; and the Concoction therein is less happily perfected; and so there are generated greater store of Excrements, that in time prove a great impediment unto Nature in her work.

Secondly, They say, that from this frequent unbinding and loosening of the wound, the handling thereof, and the moving of the part, the cleansing thereof, and the laying on of new Medicaments, and by means likewise of the new binding up, a pain is oftentimes excited, which they say may very well be the cause of a Fluxion. For it can no waies be, (saith *Cæsar Magatus*, in his 1. *B.* and 32. *Chap.*) but that, while we handle the part, there will be some pain excited; and indeed the greater by how much the greater the Wound is, and the part wherein it is endued with an exquisite sense. For we are forced in the opening of the Wound, and the new binding it up again, to move the part from its former Scituation. We take away the Medicaments, we cleanse and wipe away the *Pus*, we impose new Medicaments, and then we binde up the Wound again: al which operations cannot possibly be performed without pain.

Thirdly, They object, that if the Wound be too often opened and uncovered there will then Exhale much of the heat and Spirits.

Fourthly, and last of all, That Nature also as often as the Wound is loosned and uncovered, so often is she disturbed, and distracted from her proper work and office.

III. *Cæsar Magatus*, (in his 1. *B.* and *first Chap.*) and *Ludovicus Septalius* (in the 1. *B.* of his *Physical Animadversions*) after this manner endeavour to infringe those causes and Reasons, for which it seemed necessary unto the Ancients, and at this day doth seem altogether needful and requisite, that Wounds should often be uncovered, and new Medicaments imposed and laid on.

Magatus his Confutation of the Reasons of the Ancients, for their often uncovering of Wounds.

And first of all, this is brought for a common and received opinion, that in hollow wounds there is evermore generated a double kind of Excrements, thick, and thin; as it appeareth from *Galen*, his 3. *B. of the Meth. of Curing*, and 9. *Chap.* and that therefore we are alwaies so to reckon, that it ought to be throughly dried up, and wiped away; and that therefore the Wound is daily to be opened, that so the *Pus* may be cleansed away, and new Medicaments applied. For those that were at first laid on cannot long keep entire their strength and virtues, in regard that they are dissolved by the heat of the part and also corrupted by the mingling of the Excrements. But if the Excrements be not throughly dried up, and purged forth, being retained in the Wound they hinder the generating of Flesh, and the conglutination of the Wound; and become likewise more sharp and Corrosive; Yea further, they often acquire a putridness, from whence may proceed Pains, Inflammations, Impostumations, Worms, and Gangrenes.

The Answers.

Now unto this they thus Answer; first of all, that there is no great danger threatened from the *Pus*; since that there is no necessity that there should be any great store thereof bred in Wounds, but then only when by Reason of the frequent uncovering of them the Native heat is debilitated. Neither is there any need (say they) that these Excrements should be consumed by the imposing of various Medicaments; seeing that the Wounds of the internal parts, the Liver, the Lungs, the Tongue, and other parts, (in which we cannot possibly come to apply Tents, or Liniments spread over with unguents) they are yet nevertheless healed by Nature. And albeit, (as *Cæsar Magatus* writes, in his 1. *B.* and 44. *Chap.*) it may be admitted, that two Excrements (to wit, a thick, and a thin) may be generated in the Wound; yet nevertheless he thinks not this a sufficient Reason why the wound should be often uncovered. For the thin Excrement may partly be digested by insensible exhalation; and partly driven quite forth of the Wound by the heat

of

of the part; and for the thick, there is so little thereof at the very first, that it needeth not at all any Medicaments to cleanse it away; and that after in process of time it is confounded, and becometh one with the *Pus*, and so is by Nature expelled forth together with the same.

Secondly, For this Cause likewise the frequent uncovering of the Wound is held necessary, in regard that there is sometimes need of Manual operation; since that in the Cavity of a Wound there may be collected many Excrements that cannot possibly be purged forth by any Medicaments; but they are to be cleansed away by the operation of the Hand.

Answer. But now *Cæsar Magatus* (in his 44. *Chap.*) denieth this; and there determineth, that the Excrements that are bred in a Wound may partly be insensibly digested by exhalation, and partly by Nature sensibly expelled by the Wound, when there is present a fit afflux, and this no waies hindered, and detained in the Cavity of the Wound.

Thirdly, Wounds are therefore (according to the common opinion) often to be uncovered, that so according to the various State and conditions of them various and different Medicaments may be imposed; first of al, Suppurating or Digestive Medicaments, then Absterstive, after that such as generate flesh; (and sometimes likewise such as take away superfluous and proud flesh) and lastly, such as produce a Cicatrice. Al which seeing that they cannot possibly be effected by one only Medicament, therefore the Wound is often to be opened, that so unto every state of the wound fit and convenient Medicaments may be administred.

Answer. Unto which Argument *Magatus* (in his 1. B. and 44. Chap.) endeavoureth to give an Answer; to wit, that this is indeed necessary in the old way of curing, but not in his new way; as being such in which the care of the Excrements is for the most part committed unto Nature her self: and in his 37. *Chap.* he writeth that he is wont to commit the whole work to Nature; and that it is sufficient, that the Medicament serve instead of a covering, and discharge the Office thereof, by cherishing and defending the Natural heat; and that the same Medicament may in all Wounds undergo the Nature of a covering, and serve instead thereof. And he saith that he himself hath observed, that Wounds have been suppurated, throughly purged, and filled up with flesh, by the help only of the ordinary and common Digestive. Now he thinketh that the Medicaments cannot perform this any other waies then by their corpulency and bulkiness, whiles that they hinder and forbid the efflux of the heat, and defend the part from all external injuries: but that it maketh no great matter, what quality shal be adjoyned unto this corpulency; especially, in regard that for the most part such Medicaments are made choice of that are of a temperate heat, and most agreeable unto our Nature. And at length *Magatus* concludeth, that by any Medicament of a convenient corpulency, (provided that it be not poysonous, and corruptive, or so sharp and Corrosive that it excite and cause a fluxion) all hollow Wounds that are curable may be cured, and filled up with flesh.

Fourthly, It is therefore also thought that Wounds ought often to be opened and uncovered; that so it may be known, what the effect is of the Medicament applied; and whether or no it be sufficiently drying; whether the Wound be moist, or not, that so the driers may answer in a due proportion unto the moisture; since that the more moist Wounds are to be cured with the drier Medicaments; as *Galen* tels us, in the *third B.* of his *Method*, and 3. *Chap.*

Answer. But unto this *Cæsar Magatus*, and *Ludovicus Septalius* give this Answer, that for the cause aforesaid there is no need at all of this frequent uncovering of the wound, seeing that in this new way of curing the care of the Excrements is not to be committed unto Medicaments, but unto Nature, and the natural heat; and our study must be only how to cherish this Native heat.

Fifthly, And for this cause also the more often uncovering of the wound seemeth to be necessary, that the state of the wound may be known; and that the Symptoms that are wont here to happen may the better be prevented; and those things of which *Hippocrates* maketh mention, 1. *Prædict. Text* 18. 5 *Aphor.* 65, 66, 67. 6 *Aphor.* 4. may be sufficiently known.

Answer. Unto which they Answer, that al those things may be known some other way, and by other means; as namely, from the itching, the heat, the smel that comes from it, the beating pain, the terrible Feaver, heaviness in the part, and the like: and that evermore the Eyes of the minde are sharper sighted and see more cleerly then the Eyes of our Body.

Sixthly, And for this cause likewise the wound seemeth to require frequent opening, that so the Swaths and little Pillows, and the Linen clothes laid thereon may be wiped and made clean: which *Hippocrates* (in his *B. of the Office of the Physitian, Sect.* 2.) and *Galen* (in his *Commentary*) do both of them strictly enjoyn; in regard that the filth

and impurities of the Wound may excite an Itching Pain, and at length an Inflammation.

Answer. Unto which *Septalius* answereth, and granteth that the Swaths may indeed be changed, provided that the Wound be not uncovered.

Seventhly, For this cause likewise the Swaths and coverings of the Wound seem to require often changing, that so the hurtful Exhalations that are bred in the Wound may pass forth; in regard that being kept shut in they disaffect the wounded part, and alter the temperament thereof.

Answer. But unto this also *Magatus* answereth that there is no necessity that the wounded part should have so many and such Linen Clothes put upon it, neither that it should be so close and strictly bound up, but that the offensive vapors might exhale, and not be supressed. And that if the *Pus* hath a passage forth, much more then may the Vaporous Excrements be scattered, and find a passage forth: and that should they be stil kept in, yet they never bring so much hurt and damage as cometh by the uncovering of the wound.

But in very truth, (that I may briefly shew you my opinion touching this controversie) I will not in the least detract from the Reputation of these men, (*Cæsar Magatus*, and *Ludovicus Septalius*) men so Famous and Eminent, that they are not to be so much as named without due honor and respect: and yet nevertheless I shall take the liberty to say, that here in this controversie they seem to me to seek (as we say) a knot in a Bul-Rush: and that there is not any sufficient cause to move them to find fault with that Ancient way and Method of curing of Wounds; and so to extol this new way of their own. For first of all they themselves cannot but confess that in the old way of curing (for so many Ages past) many and the most grievous Wounds have been happily Cured. And then again, neither can they deny this, that that new way of theirs hath place only in a simple Wound, (the wounded person being of a sound and good habit) in which there is neither any great Vessel cut, nor yet any Nerve hurt: and we likewise admit the same for a truth. For such Wounds as these, in regard that they have no danger at all attending them, (and that they may likewise be Cured by Nature alone, without any help at all from Medicaments) we do no way approve of either the Curiosity, or the unseasonable diligence of those that without any urgent cause at all will be often uncovering the Wound, every day, not once only, but twice or thrice; and we grant also (as a thing very commonly known) that such like sleight Wounds (if you lay but a little Lard thereon, or some such like thing, and with one or two bindings up) are cured of their own accord, and by the strength of Nature. But on the contrary, they themselves acknowledg (and of necessity it must be confessed) that there are many wounds in the curing of which there are so many obstacles and hinderances in Natures way, that if they be not removed by the Physitian, Nature will never be able of her self to unite the wound, and therefore that simple provision is not sufficient in those Wounds. And they likewise altogether grant and allow of an opening of the Wound, if there be any thing to be done therein that cannot be performed without a Manual operation; and if there be any necessary Medicament to be imposed, and that there be danger in the omission thereof, which they grant ought instantly to be remedied, and prevented all that may be. For if (as *Septalius* puts these cases) the body be Cacochymical, or that some one or other of the greater Vessels be cut, or a Nerve hurt; if withal the flesh shall be battered and bruised, (which may have need of Suppuration) if the Wound hath so narrow an Orifice that the *Pus* hath no passage forth of it; if any bone shall be hurt, or any Noble and principal part uncovered, (so that there shall therefore be need of Manual operation;) if there shal be much *Pus* and Excrements generated in the wound; (from whence a pain, a corruption of the part, an Inflammation, and breeding of Worms may proceed) if proud flesh shall abound; if there shall be present a vehement pain; if an Inflammation or a Gangrene be feared; if any smal bone, or any other substance stick fast in the wound that is to be taken forth: or if (as *Cæsar Magatus* in his 1. B. and 38. *Chap.* puts the case) the flesh groweth forth too much; if an Hemorrhage be urgent and require it; if there be nigh at hand a Gangrene and corruption of the part; if there be present an extraordinary putridness and nastiness of the part; if there be many Excrements heaped up & an Inflammation of the part nigh at hand; if any Heterogeneous and Extraneous Body stick in the Wound; if an Impostumation follow thereupon, and that there be present any Pain, Itching, ill savour, or any bones be broken: in all these cases they of their own accord grant that this simple binding up of the wound (in this their new way) will not suffice, but that the other more laborious provision and operation of the Ancients is necessary, and to be preferred before

The general examination and inquiry into the Opinion of Magatus *and* Septalius.

fore this their new way and Method of curing.

And therefore, since that the exceptions are too many for the Rule, and derogate much from the same, I conceive that this their new way of Curing wounds is very rarely sufficient, and that for the most part many destructive Symptoms and evils (if the wound be not opened until the fourth, fifth, or seventh day) may ensue and happen thereupon. And therfore we likewise willingly grant, that Wounds without urgent necessity are not too often to be opened, and over rashly to be exposed unto the Ambient Air: and yet withal likewise understand me with this caution, that if the Wound be over seldom and but now and then uncovered, cleansed, and necessary Medicaments laid thereon, much damage and danger may befal the Patient. And therefore it is affirmed indeed that this new way of curing Wounds is easier, shorter, less troublesom, and more safe then the Ancient Method: but it is not in the least proved. And be it so, that it is less troublesom, more compendious and short, and likewise more easie; it cannot (this notwithstanding) be proved, neither will it follow, that it is alwaies the more safe and secure way. For who is he that dareth (or can safely) admit of this new way of curing, in those deep and narrow Wounds that are by pricking, and by Weapons that have sharp and not thick points; and that will adventure to commit unto Nature such a like Wound, imposing only some covering thereupon, and so not open it before the seventh day? For true it is indeed, that Natures intention in endeavouring the Conglutination of the Wound is at that time likewise right, as well as at other times and in other wounds; but it may so happen, that the Wound may Conglutinate in the superficies, before it be conglutinated in the bottom thereof; from whence *Pus* cometh to be collected in the bottom of the Wound, which bringeth with it many and great dangers; and therefore such a like wound is again to be opened, as sad experience hath often taught us.

But that we may (in special) weigh and consider the Arguments on both sides, we wil first of all examine those Arguments that drew those eminent Men (*Cæsar Magatus*, and *Ludovicus Septalius*) into this Opinion.

A more special examination of the Reasons of Magatus *and* Septalius.

And First of all, as for the experience they talk of; the Ancient way of curing hath likewise the same to plead for it; seeing that none dares deny, that infinite numbers even of such as have been most dangerously and desperately wounded have been cured thereby. And yet nevertheless I hinder none; but let every man consult experience, and make inquiry, whether he can find out any thing that is better; yet alwaies provided that what he hath so found out may be practised without any damage or danger unto the sick party. But as for that which *Ludov. Septalius* alleadgeth (in special) touching the Wounds of the Head, and that many (in a very tickly time at *Milain*) this way recovered thereof; Yea, (as he writeth) more then those that were cured in the former old way; he doth not here sufficiently explain himself, what kind of Wounds these or those were. For of the Wounds of the Head, it is possible that some of them may be mortal, and others of them curable. But *Cæsar Magatus*, although he describeth the qualities of those Wounds in the Head, of which he bringeth a few examples; yet nevertheless, he doth not prove this, to wit, that those wounded persons were cured by reason of that new way of curing; and that they might not as wel have recovered if the old Ancient way and Method had been practised. For he himself oftentimes very rightly inculcates, and writeth very cleerly, that it is Nature that cureth the Wound, and not the Physitian, or Medicaments. For if the *Pus* ought to be moved, this is performed by Nature; or if that flesh be to be generated, and the broken bones to be strengthened by a *Callus*, these are the work and business of Nature. If the Wound be to be Agglutinated, it is she that must do it; and if the Excrements ought to be expelled, this is likewise her Office. And through the strength of Nature there happen Miracles oftentimes in Wounds; Yea (as he proveth in his 37. *Chap.*) a strong Nature wil likewise bear out and overcome the Errors of the Chirurgeon committed in the Cure. And so (no doubt) may those Chirurgeons that stil use the old way and Method of curing produce the like examples on their part. That Student that was run through the *Thorax* (his Lungs being withal wounded) of whom we made mention, in the 2. *B. of our Practise*, 2 *Part. Chap.* 11. and a little above, in the 3. *Chap. of the Wounds of the Lungs*, was cured within the space of one Month: the care of which Wound (in regard that it was inward) was chiefly to be committed to Nature; and the cure thereof to be ascribed unto her, and not either unto the old, or the new way of Curing. And *Glandorpius* relateth that a Wound of the *Oesophagus* was in twenty four daies drawn all over with a Cicatrice, as you may find the relation in his *Speculum Chirurgic. Observat.* 30.

And

And indeed I will (in the next place) most readily grant him, that those frequent terebrations (which seem sometimes to be instituted rather for the exercising of the Chirurgeons Body, then for any need the Patient hath of them) are not alwaies safe; and that they sometimes bring more damage then benefit unto the sick person But yet that the Wounds of the Head are not to be uncovered before the fifth or the seventh day, this I shall not so easily grant him; seeing that such Wounds pass through divers parts: and heap up divers sorts of Excrements; and for the most part there is Blood collected between the Skul and the Membranes of the Brain; which is therefore with al possible speed to be evacuated. For which cause the Terebration also and the perforation of the Skul is sometimes necessary, lest that this Blood if it be kept in putrifie, and so cause grievous Symptoms, Yea, and (as oftentimes it doth) bring Death it self upon the wounded person: which may likewise very easily happen, if those Wounds should seldom be opened and cleansed.

Secondly, The Reasons alleadged by *Cæsar Magatus*, (and out of him by *Ludovicus Septalius*,) are of no great moment, at least they carry not that weight in them that may perswade the rejecting of the old and usual way of curing Wounds. First, they mainly urge this, (and indeed herein chiefly consisteth the very strength and pith of this Opinion) that the heat of the wounded part is to be preserved: and they accuse *Galen* for that he hath omitted an indication of the greatest moment, and that he hath troubled himself more then he needed in other things of far less moment; and about the generating of Excrements in the Wound: whereas if the innate heat be preserved, there will be but very few Excrements bred, and those that are, will be such as can no waies hinder the glutination of the Wound. Where we willingly grant, and do confess, that Nature as she is the Curer of other Diseases, so she, is the healer of Wounds likewise; and that it is she alone (and not the Medicaments) that by the benefit of the Natural heat doth perform this glutination of Wounds; and therefore that the innate heat, and the natural temperament of the part is carefully to be preserved and cherished. And this (albeit that *Galen* hath passed it by in that place where he professedly treateth of the Cure of Wounds; but whether he hath therein done well or ill, I here dispute not:) yet notwithstanding in other places he often inculcates, that there cannot possibly be any curing of the Wound, unless the part obtain its own Natural temper: and those very Medicaments (which are called Sarcotick) are provided for that very purpose, the Conservation of the heat of the part, as we said before in the precedent Chap. But here two Questions arise; the first this, whether the natural heat be preserved bettter in this new way, or in that other old and wonted Method of curing; and whether or no there be any necessity that more excrements should be generated in the old way, then in this new manner of curing. The Second Question is this, whether the alone preservation of the Native heat be sufficient for the curing of the Wounds? We deny both. As for the First, it shall be shewn in the following Arguments, that the more rare and seldom opening and uncovering of Wounds is oftentimes more hurtful and prejudicial unto the Native heat, then useful and serviceable thereto; but on the contrary, the more frequent uncovering of the Wound, (and as oft as there is need thereof) is no way offensive unto the Native heat; and that therfore it is not by reason of the uncovering of the Wound, but by reason of the debility of the heat, or the constitution of the part, or the Body, that those Excrements are generated. For when there is blood poured forth in the Wound, from hence it is that the heat and spirit is dissipated, and the part rendered the weaker; from whence it is likewise that in the Concoction that is made in the part there are very many Excrements generated. And that sometimes fewer, and sometimes more Excrements are generated in the Wound, this is not therefore because that the Wound is more seldom or more frequently opened and uncovered, but because the whol Body, and the wounded part are more or less disposed unto the generation of the said Excrements. But as for the Second, to wit, that the innate heat alone is not alwaies sufficient for the curing of the wound, this is apparent; since that there oftentimes so many impediments and obstacles cast in Natures way, that unless they be by the Physitian removed, and that indeed very frequently, even every day, Nature can by no means attain unto her end and drift. The *Pus* first of all, and the Excrements that are collected in the wound, are to be evacuated; and sometimes a passage forth likewise made for them (as oft as need requireth) by Tents; and those Medicaments that cherish the heat, dry up the Excrements, and hinder the generating of them, and help forward the Glutination of the wound, are often to be laid on; since that when they are once laid on they are soon defiled with the *Pus*, and *Sanies*, (that is to say, the thick and thinner Excrements of the wounds) and thereby weakned; and the virtue of them is likewise otherwise dissipated by

by the heat of the part. And albeit that *Galen* (where he treateth of those Medicaments that are necessary for the curing of Wounds) maketh no particular mention (in special) of those Medicaments that cherish and preserve the Natural heat, (which that he ought to have done, I deny not) yet notwithstanding he elsewhere very frequently tels us, that the heat and temper of the wounded part is to be preserved; and that unless the temper of the part be in a right frame and Condition, it is not possible that the Cure of the Wound should ever succeed happily; and those very Medicaments themselves that he often propoundeth for the drying up of the Excrements of the wounds, do Cherish the heat: and as I said in the foregoing Chap. it seems to me, that those Digestive, and Sarcotick, and Glutinating Medicaments, are made and provided, rather for the conservation of the native heat, then for the doing of any thing else.

The second Reason that *Magatus* brings for his new way of Curing wounds, is this, that there cannot be excited any Afflux of humors, since that in this way the heat of the part is preserved, and that by the often handling of the wound there is not any pain caused that may excite a Fluxion. But (as we shall further shew you in the following Reason) the truth is that in this more rare and seldom opening of the wound the heat of the part is not better preserved then in the former old way. But then as touching the pain that may be excited by the more frequent uncovering of the Wound, the Cleansing and purifying thereof, the imposing of new Medicaments, and the new binding of it up, it is the part and office of the skilful Chirurgeon so to handle the wounded part, that the least pain (and as little as possibly may) be excited. Neither in the evacuation of the *Pus* is the part to be pressed down hard together, but the said *Pus* is most lightly and gently to be wiped away; unless haply the Wound be sinuous and full of turnings. For in such wounds the pressing together of the Sinuous winding part is both useful and necessary; yea moreover, for the better pressing forth of the *Pus* from the very bottom of the *Sinus*, there are likewise little pillows or Cushions to be imposed. And then the benefit and commodity that ariseth from that short and momentany pain will not only countervail, but likewise far exceed the discommodity and inconvenience.

Thirdly, Neither is this that he alleadgeth for his third Reason, of any weight or moment; to wit, that in this new way the wounded part is more rarely exposed unto the Ambient Air, then in the ordinary and usual way. For the good and Benefit that proceedeth from the Cleansing of the Wound and the imposing of Necessary Medicaments, is far greater then the hurt and damage that is brought thereunto by the admission and letting in of the Ambient Air. And this discommodity may likewise in great part be prevented, if the Wound be not uncovered in a cold Air, but in that that is somwhat warm or temperate; and that this be no oftner done then urgent necessity shall require; and that before ever we begin to open the wound, all things Necessary and Requisite for this new binding up be at hand, and in such a readiness, that the whol business may be performed with al possible speed.

Fourthly, Neither is this any sufficient Reason for the preferring of this new way of curing before the old, to wit, that in a wound of the head the bone that was impostumated, and no hopes but that it would be lost, hath yet in this new way been preserved. For it is not as yet proved, that the same might not as wel have been in the Ancient way and Method of curing; and it is daily observed, that in the use of the old way, those bones that seemed to be impostumated and like to fall out, have yet again been Agglutinated unto the rest.

Fifthly, *Magatus* affirmeth, indeed, that under that new way there will be fewer Excrements collected then under the Ancient way: but he doth not prove this; and he evermore presupposeth that the innate heat is more rightly and better preserved in the more rare and seldom opening of the wounds then in the frequent uncovering of the same. And we grant indeed, that by the vitious and faulty concoction of the part, many the more Excrements may be bred therein; but this notwithstanding we deny, that these Excrements proceed only from the debility of the heat caused and contracted from the Air; in regard that there may be very many causes thereof, to wit, the abundance of vitious humors in the Body, and the conflux of them unto the wounded part, some of the greater vessels hurt and pouring forth much blood, a contusion and bruising of the part; and many other such like.

Sixthly, Unto the sixth Argument we Answer, and grant indeed, that there is also a more happy expulsion made by Nature of smal bones, and other Extraneous bodies, if the innate heat of the part be strong and vigorous: but then notwithstanding this is yet again to be proved; and it is not to be presupposed, that the Native heat is more rightly to be preserved and corroborated in this more rare uncovering of the wound; as we said

said before, in answer unto the first Argument.

Seventhly, and lastly, *Magatus* alleadgeth likewise this for an Argument (but without any proof at all) that the virtue of the Medicament at first imposed for the perfect agglutination of the Wound will the better endure and be kept intire: touching which hereafter in the causes for which Wounds are often to be uncovered, (in the first Reason) we shal speak further.

And now likewise (in the next place) those Arguments for which they reject the Ancient Method of curing Wounds, are by us well to be weighed and considered. And as for what concerns experience, the question is stil in Controversie, and not as yet determined, to whether of these two waies the better is to be ascribed; seeing that it cannot be denied that hitherto infinite numbers have in the old way been cured. And here we are to take special notice, that many things in the curing of Wounds are oftentimes attributed unto Art, and the skil of the Artist, that are rather to be ascribed unto Nature, that is the alone curer of Wounds, as of all Diseases whatsoever. And *Cæsar Magatus* himself confesseth, (in his 1. *B.* and 31. *Chap.*) that a strong and vigorous Nature correcteth likewise many errors that have been by the Artist committed, sleighting and overmastering those things that might have proved prejudicial unto her through the ignorance and inconsiderateness of the Chirurgeon: and this (he saith) that himself hath frequently found by experience, whiles of set purpose he took little pains, nor much troubled himself thereabout, as being minded and resolved to observe what Nature in those stronger bodies was able of her self to perform; and that therfore he somtimes administred those Medicaments that were not altogether so fit and convenient, and that yet notwithstanding the sick party by the help and assistance of Nature recovered, and became sound again.

But now as for those Reasons that he objecteth against the Ancient way, the first of them is this; that the wounded part is too often exposed unto the Ambient Air, from whence its heat is weakned, and so thereupon great store of Excrements bred and treasured up. But as for this that is so often imputed unto the Ambient Air frequently admitted into the Wound, and that for this cause alone the greater abundance of Excrements are collected, this is only said, but no waies proved. For these Copious and abundant Excrements do not proceed from the Air, but they have other causes. For that smal and inconsiderable appulse of the Air (which yet notwithstanding, as I have said, is by all means possible, and as much as may be, to be avoided, and the operation therefore to be performed in a warm place) it cannot cause so great an alteration. And moreover also, the Excrements are likewise collected, because that the Blood and Humors faln forth of the Vessels are necessarily converted into *Pus* and *Sanies* (that is to say, thick and thin Excrements) although the temperament of the part be sound and unhurt. But that the very temperament of the part may be hurt even by the Wound it self, as also by the cutting and opening of the Vessels, and likewise by the efflux of the Blood and Spirits, is a truth that cannot be denied: and *Cæsar Magatus* himself (in his first B. and 9. Chap.) taketh upon him to prove the same at large. And this very weakning of the part (by Reason of the wound inflicted) and the change and alteration of the temperament, is the cause, that not presently and on the very first day the *Pus* is generated in the Wound, but for the most part on the fourth day, to wit, when Nature hath recovered and gotten her strength again, and the heat of the part is renewed. And furthermore, the Bodies on which Wounds are inflicted are not evermore exactly sound and pure, (but oftentimes Cacochymical) albeit they may seem exactly sound; which although they receive but some very light and sleighe wound, yet this in these Cacochymical bodies degenerateth into an Ulcer, by reason of the vitious humors that abundantly flow unto the wounded part.

As for what is in the Second place objected, that from the frequent loosening of the wound, the often handling and moving of the part, a pain and thence a fluxion may be caused in the part affected with the Wound, unto this objection we have already before given an Answer. To wit, that the experienced and skilful Chirurgeon may very easily prevent the said pain: and although that some pain should chance to be excited from the uncovering of the Wound; yet nevertheless the inconvenience and pain that would arise from the reteining and not cleansing away of those Excrements might prove far greater, and of a more dangerous Consequence.

Thirdly, *Magatus* (although without cause) feareth, lest that in the uncovering of the Wound there should happen a dissipation of the spirits and Native heat. For if there be any such dissipation of the Spirits and heat, this happeneth together with the very effusion of the blood. But then so soon as this flux of the Blood stoppeth, the orifices of the Vessels do again shut close, so that there needs no fear at all of any such dissipa-

tion

tion of the Spirits; and Nature being otherwise follicitous and careful about the preservation of the spirit and the Radical heat, expelleth the offensive and hurtful Excrements and stil reteineth those that are useful; as we may plainly see it to be done in Critical Evacuations.

Fourthly, and lastly, they object this also, that as often as wounds are unbound and opened, so often is Nature disturbed and distracted from her proper Office and Work. But there is no ground at all for this fear. For Nature cannot in so short a space of time (as while the Wound is opened and bound up again) possibly be disturbed, unless there happen a very great and extraordinary alteration. But it will be rather disturbed, if the Wound be not cleansed from those Excrements.

III. *Cæsar Magatus* and *Ludovicus Septalius* do not solidly confute those causes by which the Ancients, and all the Chirurgeons even unto our very times, were moved and drawn unto this often opening and unbinding of Wounds.

For First of all, that they determine and conclude that Wounds are therefore often to be uncovered, that so those Excrements that are necessarily generated may be evacuated; this (say these) is not indeed Requisite, and altogether needful; in regard that the thin Excrement may partly be digested by exhalation, and partly be driven out of the wound by the heat: but as for the thick, (if any such be generated) it is confounded and mingled together with the *Pus*, and so by Nature expelled together with the said *Pus*. But experience it self teacheth us that this is most false, that the thin Excrement is alwaies digested by exhalation; seeing that oftentimes we find that it rendereth the Wound exceeding moist, and that there floweth forth great store thereof. And for the thick Excrement, although it be mingled with the *Pus*, yet notwithstanding it is not of its own accord wholly evacuated; or if it be evacuated, it is but very slowly; and therefore being retained it acquireth an Acrimony, and so causeth a pain, and a new afflux; and therefore it is speedily and seasonably (before this shal happen) to be evacuated and cleansed away; and for this Reason the Wound is to be uncovered as oft as need shall require. For neither indeed doth Nature her self expel these Excrements. Nature (the truth is) doth separate the useful Excrement from that that is altogether unuseful. But when the Excrements are thus separated, the useful from the unuseful, and stick in the Cavity of the wound, Nature hath then no more that she can do, for it is not in her power to expel them; but the Excrement either of its own accord, and by reason of its weight floweth forth; or else it is thrust out by the flesh growing underneath it; and this if it be not done, it is left stil to remain in the wound. Neither also can the wounded part be alwaies kept in such a Scituation, and so placed, that the *Pus* by its weight tending downward should of its own accord flow forth. For all wounds whatsoever that are inflicted in the fore parts of the Body are altogether unfit for such a Scituation as is requisite for a Spontaneous efflux of the *Pus* or Noisom purulent Mattier; seeing that it is no waies convenient, that the Patient should lie upon his face. And so likewise the Wounds of the hinder part, although that they be so Scituated that the *Pus* may easily flow forth from them, yet nevertheless, a lying upon the wounded part is no waies fit and convenient, but painful, and troublesom, in regard that the whole bulk of the Body presseth and weigheth down the part affected. And in Wounds of the Head that pierce through the Skul, it is much more difficult to find such a Scituation, that all the *Pus* of its own accord and by reason of its gravity should easily flow forth, albeit the Wound be but seldom uncovered.

But *Magatus* wil not yet yield for al this, but in the 33. Chapter throughout, of his first B. he endeavoureth to prove that it is not necessary, that Wounds should be often uncovered, to the end that the thick Excrements should be cleansed away; & he endeavoreth likewise to demonstrate, that the thick Excrements, as also the very *Pus* it self, may be evacuated without the use of abstersives. And first of all indeed he alleadgeth this out of *Galen*, that he writeth (in the 13. *B. of his Method of Curing*, and 5. *Chap.*) after this manner. *But if there be some notable* Pus *contained in the suppurating particle, it is not expedient (as some do) forthwith to cut and make an incision, but rather we ought to attempt an exhalation by Medicaments avayleable for this purpose; the use whereof may be conjectured from the affect it self.* From hence he concludeth, that there is no need of Abstersives, where the *Pus* may be dissipated by Discussives. But, (that I may not now dispute this question, whether or no we may safely and securely endeavour in Impostumes to wast and consume the *Pus* with Discussives alone) be it so indeed, that this may possibly be done; yet (as he himself writeth) for the effecting of this there will be need of Medicaments that are strong and prevalent, and fit for this purpose. But when (I pray you) shall such like Medicaments be administred in Wounds, to the end that the *Pus* may be discussed? He writeth moreover, that in Im-

postumations when they are broken, oftentimes the *Sinus* (though they have been very notable, and such as have sent forth great store of *Pus*) have been filled up with flesh, no Abstersive at all having been put into the Cavity thereof, but only some Medicament laid unto the very mouth of the same; of which it was not possible that any thing should reach so low as the bottom thereof. But unto this I answer, that this is not alwaies done; but that there is oftentimes need of casting in Abstersive Medicaments; or if such may not be administred, that then the *Sinus* is to be pressed together, that the *Pus* may both flow and be pressed forth; and that this is often to be done, and for this Cause the Wound is also often to be uncovered; and that the *Pus* is by no means to be detained in such a *Sinus*. And lastly, He writeth that even internal Wounds may be also cured, although the impurities and Excrements thereof be not cleansed and done away. But I answer, that neither is this alwaies done, but in those parts only in which there are but few Excrements collected, and such as have an open and prone passage forth of them. Otherwise if the Excrements be long detained, those Wounds are not to be Cured; and this we see to be often done in the Lungs, in which from the Excrements retained Ulcers and at length the *Phthisis* or consumption is generated. And indeed, oftentimes the *Pus* and Excrements stick so close and fast unto the sides of the Wound that they cannot possibly of themselves flow forth, but that they must of necessity be cleansed away by a manual operation.

Thirdly, That therefore the Wound is often to be uncovered, that so according to the various state of the Wound, sometimes digestives, and sometimes abstersives, sometimes those that generate flesh, and sometimes again those that wast and eat away superfluous and proud flesh, may be adminstred: unto this indeed *Cæsar Magatus* answereth, that there is no need at all of that change of Medicaments, in regard that the whole business is to be committed to Nature. And that it is sufficient, if there be only a covering imposed upon the wound, that by its corpulency may prevent and hinder the efflux of the Radical heat, and that may preserve and cherish the same, and that therefore with one only Medicament divers times a Wound may be healed. But here false Principles are presupposed. The First is this, that Nature of her self alone is able to perform all those things that are necessarily required for the healing of a Wound. Indeed it is true, that Nature doth concoct, separate such things as are of a heterogeneous and different quality, and generateth flesh; but the Excrements when she hath separated them, she cannot alone and of her self expel them; but they are oftentimes so pertinacious that they will stick unto the part, do she what possibly she can. Neither do they also flow forth of themselves, and of their own accord; or is the Member indeed so to be placed, that they may of their own accord flow forth, as a little before we likewise told you. And therefore then in that Case there is need of Medicaments that may keep them from being over nasty; yea and oftentimes also of a Manual operation, whereby they may be throughly cleansed. Another of his false Principles is this; that Nature in her work standeth in no need of any Medicaments whatsoever, that so she may be holpen and assisted thereby; which that it is false even experience it self teacheth us; wherein we see most manifestly that Digestives that in the beginning are of singular use, in the progress of the Disease prove very hurtful: and this *Cæsar Magatus* himself likewise confesseth; for in his 1. B. and 37. *Chap.* he writeth that he had observed that by the use of a digestive the most grievous Wounds inflicted by Bullets shot from Guns have been suppurated, throughly purged, and filled up with flesh; but that afterward by reason of the over great humidity there hath grown a flesh upon it that hath wanted Corrosives to eat it out and consume it. His third principle (that by consequence followeth from hence) is likewise false; to wit, that one only Medicament is sufficient all the whole time of the Disease, provided that by its Corpulency it may be unto it instead of a Covering. For if this should be so, and were indeed true, then instead of an Emplaster we may as wel put any piece of Leather upon the Wound, or make use of one kinde of Emplaster for another, so that it be not deadly and poysonous, sharp, and Corroding: and yet notwithstanding he never as hitherto heard of any wise Physitian that ever did thus. And in this very point likewise *Magatus* expresly contradicteth himself, who (in the 36. *Chap.* of the same B) writeth most truly, that not every kind of covering (how ever it be made and provided) is fit for the defence and corroborating of the Natural heat; or that it is convenient for the temper of every part; and that, what is a very fit and convenient covering in one part may in another part be altogether unfit, inconvenient, and indecent, yea likewise that it may be a very hurtful & dangerous covering.

Fourthly Whereas it is the common Tenet, and that we are usually taught, that therefore likewise Wounds ought often to be uncovered, that so the virtue and effect of the Medicament may be known what it is, and whether

ther the Wound be moiſt, yea or no, that ſo Convenient driers may be laid thereto, according as there ſhal be occaſion; unto this *Cæſar Magatus* anſwereth that there is no need at all of any ſuch ado, or that we trouble our ſelves ſo much thereabout, in regard that the whol buſineſs and the iſſue therof is to be committed to Nature. But he doth not well in ſo determining. For the truth is, that Nature doth indeed evermore intend that which is beſt, but yet notwithſtanding ſhe cannot alwaies obtain what it intendeth; either becauſe ſhe is weak, or elſe in regard that ſhe is oppreſſed and overwhelmed with too great an abundance of that Object on which ſhe acteth: and therefore both the temperament of the wounded part is to be cheriſhed with Medicaments, (and theſe indeed ſome at one time, and ſome at another;) and the Excrements alſo by which Nature is oppreſſed and overburthened are to be dried up, and evacuated. And therefore we conclude, that it is overraſh and altogether unſafe to Commit the whole buſineſs unto Nature, and to ſtand looking on as an idle Spectator; ſince that it may eaſily ſo happen, that overmuch Humidity abounding in the Wound it may ſoon degenerate into an Ulcer.

Fifthly, And for this Cauſe likewiſe ſomwhat the more frequent uncovering of the Wound is held to be neceſſary, that ſo the State of the Wound may be known, and the Symptoms likely to happen thereupon may be prevented. *Cæſar Magatus* rejecteth alſo this Cauſe, and afferteth, that from other Signs, (to wit) Itching, Pain, and the feat ſcent that cometh from the Wound, we may give a ſhrewd gueſs; and he poſitively determineth that an Artificial Conjecture is the beſt; and that we may more rightly make our conjecture by the Eyes of our mind, then by thoſe of our Body, ſince that they are ſharper ſighted then theſe. But thoſe conjectures are oftentimes very uncertain: yea ſomthings may now and then happen unto a Wound that will no way be taken Notice of but only by ocular inſpection, and ſuch are the *Fungi* of the Brain, Worms in Wounds, and fleſh growing upon them. And though it be true that at the length there will ſome certain ſigns diſcover themſelves; yet it is no way ſafe, that the Phyſitian ſtand as an idle Spectator, until ſuch time as thoſe ſigns (to wit Pains, Feaver, Noyſom ſmels, and the like,) ſhall happen, and manifeſt themſelves. For when theſe once come upon the Patient, he is then moſt commonly in the greateſt danger; which by ocular Inſpection might have been eaſily foreknown, and ſafely prevented: and oftentimes in the ſpace of one day, yea of a few hours, ſome grievous evil may befal the ſick perſon. And ſo *Paræus* relateth, that he had ſeen Wounds, in which (unleſs they were daily opened, and new Medicaments laid on) Worms would continually be breeding.

Sixthly, And for this cauſe alſo the wound is to be frequently uncovered, that ſo the Swaths, little Pillows, and Linen Clothes, may be made clean. But *Cæſar Magatus* and *Ludovicus Septalius* ſleight, and account of this as of a thing of no reckoning: or if we may at any time change the Swathes, they allow it only, with this Proviſo, that the wound be not uncovered. But theſe ſhould have conſidered with themſelves, that if the Swathes be foul and unclean, much more the Wound, and the coverings neerer unto the ſame, muſt needs be Naſty and unclean, ſince that the ſanies or thin Excrement doth firſt and moſt of all defile thoſe things that do neereſt touch upon the Wound.

Seventhly, And Laſtly, whereas even for this cauſe the more frequent opening of the Wound ſeemeth to be neceſſary (as is alſo the change of the Swathes, and little Pillows,) that ſo the ſtinking Vapors in the Wound, (bred of the *Pus* and Excrements) may the better exhale, (which if they be ſtil detained & ſhut up in the wound, they affect the wounded part, and much change and alter the ſame:) unto this *Septalius* Anſwereth, that the Wound is not to be bound up with ſo many and ſuch Linen Clothes that thoſe Vapors ſhould be ſuppreſſed; and if that the *Pus* find a paſſage forth, he thinks then that thoſe Vaporous Excrements may much rather be blown abroad, and diſſipated: and if they be altogether retained that they are not likely to bring ſo much damage unto the Patient, as may befal him from the uncovering of the Wound, and the alteration of the Ambient Air.

But in whatſoever manner the Wound is bound up, (which yet notwithſtanding they themſelves grant that it ought ſo to be bound up, that it may be defended from all external injuries) thoſe Vapors may eaſily be detained, yea they may inſinuate themſelves into the Linen Clothes, and the Swathes; and hence they may offend the wounded part by their ſtench and noyſomneſs. And this is that very thing that is now in Queſtion, whether all the *Pus* may be evacuated, unleſs the Wound be often uncovered. The alteration alſo that is cauſed from the external Air cannot be ſo hurtful and offenſive, (in regard that it partaketh not of any ill quality) as is that which proceedeth from thoſe putrid and ſtinking vapors ariſing from the *Pus* and *Sanies*.

Whether there be any use at all to be made of Tents, or Pensils, in the Curing of Wounds.

The other thing wherein *Cæsar Magatus*, and *Ludodicus Septalius* dissent from the Ancients, and from other Physitians and Chirurgeous, is this, that they assert, (and endeavour to maintain this their opinion) that there is no use at all to be made of Tents in the Curing of Wounds. *Magatus* to prove this (in his 1. *B.* and 5. *Chap.*) useth these Reasons.

The Reasons that move Magatus to reject the use of Tents.

The First Reason is this; because that Tents are neither therefore to be instituted, that they may keep open the mouth of the Wound, neither that by them Medicaments may stick unto the sides of the Wound. The former of these he proveth in this manner, that before the Wound is conglutinated the orifice thereof is alwaies patent and open; so indeed, that if we desire and endeavour it never so much, yet we are not able to shut close the mouth of the Wound. And he thinketh likewise that there is no need of Tents for any other use or purpose, since that the Medicaments may be so melted, that they may very conveniently be instilled into the Wound.

The Second Reason is this, because that they are injurious, and by their weight very troublesom and grievous unto the Nature of the wounded part: whereupon it is likewise that Nature is alwaies laboring to expel them.

The Third is, because that they distend the part, press it together, excite pain, and thereupon produce new fluxions.

The Fourth is, because that these Pensils and Tents may be filled with base corrupt Humors, and so defiled therewith, that they may acquire an ill quality, by which they may hurt the wounded part: and they do moreover hinder the Evacuation of the *Pus*, and cause that the said *Pus* acquire and get it self a depraved and Malignant quality.

Fifthly, They say that *Hippocrates* and *Galen* when they write of the curing of Wounds, do never make any mention of these Tents; as we may see in *Galens* 14. *B. of the Meth. of Curing, Chap.* 4. and in *Galen his B. of Fractures, Sect.* 3. *Comment.* 21.

The Reasons of those that make use of Tents in the Curing of Wounds.

But now on the contrary, Those that make use of Tents, give these Reasons for their so doing. The First is this; that in the wounds the use of Tents is therefore necessary, that by the help of them the orifice of the Wound may be kept open, and a passage may be made for the *Pus* to flow forth.

The Second is this, that for this cause Tents are to be made use of, that so by means of them the Medicaments may every where touch the Wound, and that they may penetrate even to the very bottom thereof.

Thirdly, For this Cause likewise Tents seem to be necessary, because by them it may be prevented, that the upper part of the Wound be not closed up before the deeper parts thereof be filled up with flesh.

The Answer of Magatus unto the said Reasons.

Unto these Reasons they Answer; unto the First thus, that there will not be more Excrements generated in the Wound (if there be a due Course taken in the curing thereof) then what may easily be expelled forth by Nature. And then that although Excrements should be generated, that yet Tents do rather shut up the passage forth of the *Pus*, then any waies keep it open. And unto the Second they Answer, that there is no need of Tents, since that the Medicaments (if they be liquid) they will of themselves penetrate unto the bottom of the Wound; neither therefore is there any need of so often repeating and imposing of new Medicaments. Unto the Third they Answer, that the continual efflux of the Excrements by the external wounded parts doth hinder the meeting together and uniting of the Lips, before the Cavity be filled up with flesh.

My own Opinion.

But that I may briefly shew you my opinion touching this Controversie, I do indeed willingly grant them, that in such Wounds as are superficial, straight, and such as generate but little *Pus*, Tents are not at all necessary; neither is the curing of the Wound rashly to be retarded by the putting in of the Tents. But if the Wound be deep, and oblique, so that there be no right and straight passage for the flowing forth of the *Pus*, and that there be much *Pus* generated; in this Case Tents seem to be altogether necessary, that so by them there may be made an open and free passage forth for the purulent matter; and that a way may be left, by which the Medicaments may penetrate unto the more inward parts of the Wound; and that by this means the orifice of the Wound may be kept from Conglutinating and closing together, until such time as that which is in the bottom of the wound shall be first Conglutinated: which if they be neglected, and that the *Pus* and Excrements be still retained in the Wound, they may easily prove the Causes of

of the extreameſt pains and dangers; as a little above (in the 7. *Chapter,*) we gave you ſome inſtances and examples of this very thing, out of *Guilhelm. Fabricius* his Obſervations.

Anſwers unto the Reaſons of Magatus.

Now as for what they Anſwer unto theſe Arguments, and what they likewiſe object, they are neither of them of any great moment.

For Firſt of all, whereas it is ſaid, that Tents are not neceſſary, that by them the Wound may be kept open, ſince that the orifice is of it ſelf alwaies open, this we altogether deny. For oftentimes Wounds (according to the various Scituation of the Patient, that he then had when he was wounded) are oblique, and ful of turnings and windings; ſo that although the ſides and lips of the wound be not as yet cloſed up, they yet nevertheleſs ſo touch and lie one upon the other, yea and oftentimes ſo preſs one another, that there is no open paſſage left for the *Pus* to flow forth.

Secondly, For this very cauſe, and when the Wounds are not ſtraight, the Medicaments cannot ſo eaſily penetrate unto the bottom. And albeit that the Wound be not writhing and oblique; yet notwithſtanding it wil not alwaies be Convenient to inſtil into the Wound Medicaments that are over fluid, ſeeing that they may be eaſily waſhed away again by the *Sanies* or thin Excrement: but there will be oftentimes occaſion to make uſe of the thicker and more viſcid ſort of Medicaments, which being conveyed into the Wound by the Tents will ſtick ſo much the longer and more firmly unto the wounded parts; and thereupon they will the more rightly put forth their Virtue and efficacy.

Thirdly, That the ſuperior orifice of the Wound is never Conglutinated before ſuch time as the inferior Cavity is cloſed up (and that therefore the orifice of the Wound needeth not to be kept open with Tents) this is falſe; and experience very often teacheth us the Contrary: and *Guilhelm. Fabricius* (in his 4. *Cent. Obſervat.* 7.) reciteth two Examples of Wounds, whoſe orifices were very ſuddenly healed, and yet the Wound within all this while not cured; from whence it happened, that there was abundance of *Pus* collected within; and from thence many grievous and dangerous Maladies excited. And wheras they ſay, that the continual efflux of the Excrements wil cauſe that the orifice of the wound ſhal not be cloſed up, herein they contradict their own former preſuppoſals, when as they aſſerted before, that there would be altogether very ſmal ſtore of *Pus* generated in the Wound.

Fourthly, The Tents ought not neither to be over thick, that ſo they may not preſs the part, nor diſtend it, nor by any means whatſoever cauſe unto it any trouble, grief, or pain, and that they likewiſe ſhut not up the paſſage of the *Pus* or purulent mattier. And if now and then any ſuch thing ſhould happen, (ſuch as that that *Ludovicus Septalius* in his 8. *B.* of *Animadverſions, Num.* 10. alleadgeth out of *Hippocrates* in his Hiſtory of a certain perſon at *Maſſilium*) the Errors of the Artiſts are not to be imputed unto the Art it ſelf; whenas haply they uncovered not the Wound ſo oft as was requiſite. And yet nevertheleſs we are here to give you to underſtand, that albeit we are to uſe our utmoſt endeavour, that Wounds may be Cured without all kind of trouble and pain; (or at leaſt that they may be healed with as little as poſſibly may be:) yet notwithſtanding it is not to be expected, that in the curing of Wounds there ſhould be at any time a total and abſolute freedom from all pain and trouble, no more then there is in the curing of other diſeaſes. And indeed if al things were to be omitted and forborn that are any waies the Cauſe of any trouble whatſoever; then the ſewing of the Wound, as likewiſe the Swaths, and binding up of the Wound were all of them to be omitted. But the Rule is good in this caſe, that alwaies of two Evils the leſs is to be choſen.

Fifthly, Neither are Tents therefore to be omitted, becauſe that being defiled by the *Pus* they may hurt the wounded part. For as often as they ſhal be thus fouled and made naſty, they are to be drawn forth; and this very thing impugns the rare and ſeldom opening of the Wound.

Sixthly, And laſt of all, although that *Hippocrates* and *Galen*, where they treat of the Curing of Wounds, do not make expreſs mention of theſe Tents; ſo neither yet do they forbid the uſe of them: but rather out of the precepts of *Galen* as touching the Curing of Wounds it may be proved, that the uſe of Tents is oftentimes by him allowed and approved of.

All the premiſes being therefore thus agitated and diſcuſſed *Pro* and *Con*, the thing ſeems to come to this; and the whole ſum and ſubſtance of this Controverſie amounteth to thus much; that light and ſleight Wounds, and ſuch wherein there is not much *Pus* generated, may be committed unto Nature; and that it matters not much if ſuch Wounds as theſe be but ſeldom concovered. But yet I would not in the leaſt perſwade any Man, that in thoſe Wounds that are more grievous, and in which there is generated great ſtore of *Pus* and Excrements, he ſtand as an idle ſpectator,

Spectator and Trifler, doing little or nothing himself, but committing the whole business to Nature; in regard that from the neglect and omission of the necessary opening of the Wound, there may more danger and damage arise in one day, then can afterwards be removed in a whole Month.

And so likewise for Tents: as on the one side where there is no need of them, I would not perswade to the putting of any into the Wound, (much lets that there should be such Tents made use of that may cause pain, excite a fluxion, or hinder the flowing forth of the *Pus*;) so on the other hand, where necessity urgeth, and the Causes before mentioned require the use of them, there I conceive they cannot possibly be omitted without damage and danger. But yet nevertheless in regard that experience perfecteth Art, (example shewing us the way;) I shall not withstand or oppose any man in his making trial and experience even of this way likewise, so that it be (as I have said before) without any danger unto the Patient; and as *Magatus* himself adviseth, (in his 1 B. and 40. *Ch. about the end thereof*) beginning alwaies from those more light and easie, and from these by degrees proceeding unto those that are more grievous and difficult.

Chap. 10. *Of the VVeapon Salve.*

THose things that have been (in the *precedent Chapter*) spoken touching the opinion of *Cæsar Magatus* and *Ludovicus Septalius*, as concerning the curing of Wounds, put me now in minde of that Unguent they commonly cal the Weapon Salve. For as those simple Wounds of the flesh (as hath been said in the *foregoing Chapter*) are Cured by the benefit of Nature alone, without any other great provision, without any frequent opening of the Wound, and without the applying of many Medicaments: So those Wounds likewise that are said to be cured by this Weapon-Salve, my Opinion is, that they are cured by the help and assistance of Nature alone. But in regard that there are many who have asserted the contrary; therefore we think it not amiss in this place to make some enquiry into this Opinion of theirs; and to tel you what I conceive is to be thought as touching this Weapon-Salve.

Now we shall First of all give you the descriptions of this Unguent or Weapon-salve; and then we shall acquaint you with the use of it, and what Arguments are usually brought for the defence therof. Now most are of Opinion, that *Paracelsus* was the first that found out this Weapon-Salve, and therefore the invention thereof is by very many ascribed unto him; but whether he were the first that we find to have made mention hereof or not, of this there is no question, but that he hath been very forward in the divulging of it.

Paracelsus himself (in his 1. B. *Archidox. Magicæ*) hath this description of it.

Paracelsus *his description thereof.*

Take *The Moss of a Dead mans Skul, two ounces; Mummy half an ounce; Mans fat, two ounces; Mans blood, half an ounce; Oyl of Linseed, two drams; Oyl of Roses, and Bole-Armenick, of each one dram; mingle them, and make an Unguent.*

Into which he puts a piece of Wood that hath been soaked in the Blood that comes from the wound, and then throughly dryed; and every day constantly he covereth the Wound with a new Swathe that had been throughly moystened in the Urine of the wounded person. But then for the anoynting of the Weapon, he addeth yet further, *Honey, one ounce; and Bulls fat, one dram.*

John Baptista Porta (in his 8. B. *of Natural Magick*, and 12. *Chap.*) writeth thus of it. *The Weapon Salve (saith he) was a good while since by* Paracelsus *given to* Maximilian *the Emperor; who having made trial of it esteemed it very highly all his Life after: of which there was some bestowed on me by a certain noble person then living in this Emperors Court. If the Sword that gave the Wound were brought, or a piece of Wood wet in the blood of the said Wound, the wounded person was then cured, albeit he were never so far off.*

Porta *his description of the weapon salve.*

Take *Usnea, or the Moss that groweth upon a skul left in the open Air, and mans fat, of each two ounces; Mummy and mans blood, of each an ounce and half; Oyl of Linseed, Turpentine, and Bole Armenick, of each one ounce; let them be all wel mingled together in a mortar; and then preserved in an Earthen Vessel somwhat long and narrow. Dip the Sword into the Unguent, and so leave it; let the wounded person in the morning wash the wound with his own Water; and so adding nothing at all thereto, let the wound be bound up; and it shall be cured without any pain.*

Crollius *his Description.*

And *Crollius* himself likewise attributeth this Unguent or Weapon Salve unto *Paracelsus*; and he cals it the Sympathetick Unguent of *Paracelsus*; and thus he describeth it.

Take *the fat of a Bore Pig or Brawner, and Bears fat, of each four ounces; The older these Creatures are the better is their fat. Let both these fats first of all (for the space of half*

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an hour boyl in red wine over a gentle fire. After this it is to be poured out upon cold water and the fat swimming a top is to be taken off with a spoon, and whatsoever sinks to the bottom throw it away. Then afterwards,

Take, of Earth worms washed in Wine or Water, two sextaries; let them be put for a while into the Bakers oven in an Earthen pot covered, where as they must be baked, so you must have a great care that they be not burnt; and after this, beat them into a pouder.

Take Of this Pouder, the dryed brains of a Brawner, Red Saunders that smells sweet, Mummie, and the Hæmatites or Blood stone (as he calls it) of each one ounce. After this,

Take Usnea, or Moss from the skul of one that died a violent death, let this Moss be cut off from the skul in the increase of the Moon, and she being then in a good house, as that of venus (if it be possible) but not of Mars, or Saturn, the weight of two silberds or thereabout. And all of them being bruised together, and well mingled with the fat, let there be an unguent made according to art; and then in a Glass vessel stopt (or if you think good, in a Box) let it be carefully kept for use.

If after long time the unguent happen to be over dry, it may be a new moystened and softened with the aforesaid fat, or virgin houy. Let the Unguent be made, the Sun being in the sign Libra.

The Use of this unguent.

Now as touching the Efficacy and use of it, he thus writeth: This cure is performed by the Magnetick attractive virtue of this Medicament, caused by the constellations, which thorow the medium of the Air is brought unto the wound, and Joyned therewith, that so the spiritual operation may be drawn forth into effect. Its wrought (I say) by means of the Astral and Elementary conjunction.

There are therefore three things that by this unguent cause so admirable an Effect. 1. The Sympathy of Nature. 2. The influence of the heavenly Bodies, perfecting their operations by the Elements. 3. The Balsam, which being endued with a virtue of healing is naturally applyed unto any man, wit out any difference. With this unguent are cured all Wounds, by what weapon soever they be inflicted, and whatsoever the sex be, (and yet so notwithstanding that neither the Nerves, Arteries, nor yet any one of the three more principal members be hurt) so that the Weapon may but possibly be had, although the patient be many miles distant from us And in regard that it is of a Conglutinating, Suppurating, and renewing Nature, it doth not permit (if it be rightly applyed) any hurtful symptom to follow upon it.

The manner of applying the unguent, or weapon salve.

First, Let the Weapon wherewith the man is Wounded be anoynted every day once, if necessity require it, and the wound be great: but otherwise it will be sufficient, if the Weapon be anoynted every other, or third day; and then let it be kept in a Clean Linen Cloth, and in a place a little warm but not over hot, lest that any damage should thereby be brought upon the Patient: We must likewise be very careful that the Weapon fall not down from on high, neither that the wind blow upon it in a cold place; for if this should happen the Patient will run mad.

Secondly, Before you anoynt the Weapon, Consider, whether the Wound were made with the point, by pricking: and if it were, let the Weapon be first anoynted upwards, (and not below) and so descending toward the point thereof; for otherwise much hurt may be brought upon the Patient.

Thirdly, But if thou canst not certainly know how deep, or in what manner the Weapon entered into the flesh, thou mayst then anoynt it all over; but otherwise it will be sufficient to anoynt that part of the Weapon wherewith any one is hurt.

Fourthly, There is no Necessity of sewing the wound together after the manner of Barber Surgeons; but every day only to bind it up with a clean linen Cloth, first wet in the Patients Urine.

Fifthly, That day that any one anoynts the Weapon, let him abstain from Venery.

Sixthly, Before the anoynting of the Weapon, let the Wounded persons blood be with al speed stanched.

Seventhly, In fractures, and ruptures of bones, you may add unto the unguent some of the powder of the greater comfry, or the roots of black Hellebor.

Having the weapon wherewith the Patient was hurt, if thou be desirous to know whether the Patient be likely to live, or to die of his Wound; thou art to make the trial in this manner. Take the weapon and make it hot over the coals, so hot that thou can hardly endure thy hand upon it; and then sprinkle upon it some powder of Red Sanders, and the blood stone; and if the Weapon then sweat drops of blood, the patient will die; but if not, he wil escape it.

But if we would know whether the Patient order himself aright in his drink and other Requisites: this may thus be known, if there be in the weapon spots of blood, he is disordered; but if no such spots, then the Patient ordereth himself aright.

We are moreover to take notice; first, that if we have not the Weapon, (or instrument whatsoever it were) yet nevertheless that any violent

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opening of the Skin, and hurting of the flesh, by which any Blood goeth forth, may be Cured with this unguent, so that a little piece of Sallow Wood be moystened in the bloody opening; and after that the Blood sticking thereto be dryed (not by the heat of the Sun, or the fire, but of it self, and own accord) it be then put into the above mentioned Unguent, kept close covered in the Box, and there left.

Secondly, If the Wound should be great and deep, it may then be cleansed every morning, and bound up with a new Linen Cloth, without any other use of Extraneous Oyls, Unguents, and the like; and then this wound (how ever it were inflicted) will heal of it self; and it sufficeth that the little piece of Wood once only moystened in the opening of the Bloody wound, be then put into the Box of Unguent (as aforesaid) and there left to remain, until the Wound be perfectly Cured.

Thirdly, But yet notwithstanding, as oft as any new Wound is to be healed, there is alwaies required a new piece of Wood.

Fourthly, But if it be so that the Wound will not bleed, it is then with the Wood so long to be scarified, until the blood flow forth: and so likewise in the curing of the Tooth-ach; the pained Tooth is so long to be scraped with a Pen-knife, until it bleed; and then the Pen-knife after the blood is dryed up, is to be anoynted with this Unguent; and so the pain is presently asswaged. If a Horse be prickt with a Nail in his Foot, let the Nail be first of all drawn forth, and anoynted with this Ungment, and the Horses Foot shall immediately be cured, without any suppuration at all.

And so in this same manner all living Creatures having flesh and Bones may be Cured.

The description of Gabelchoverus.

Oswaldus Gabelchoverus (in his *Practica Germanica,*) thus Describeth it.

Take *the fat of a Boar, and of a Bear, of each one pound; and these being melted he poureth them into red Wine, Unto this fat he addeth powder of the Blood-stone, one ounce; Red Saunders, six ounces; Earth-worms prepared two drams; Usnea or Moss of a dead mans Skul, as much as may be gotten; and then he mingleth them, and maketh an Unguent: touching the use whereof he writeth almost the very same that* Crollius *doth.*

Another Description.

Others have this Description of it.

Take *the Lard of a Brawner (melted on the fire, and poured forth upon cold Water) as much as you think good; the powder of prepared Earth-worms, the powder of the Blood-stone, and of Red Saunders, and Usnea or Moss of a mans Skul, of each as much as will suffice, and mingle them at the Fire.*

Johannes Wittichius leaveth out the *Usnea* or Moss, and he thinks the matter not great, whether it be put in, or left out of the Composition. Neither doth he add the Mummy, or the fat, or the Blood. And this others likewise do. And I my self knew one, who undertaking such a Cure, Compounded (as oft as he pleased) this Unguent only of the *fat of a Porker,* and a few other things, without any of the said *Usnea,* or any thing else taken from the Body of Man.

Colerus *his Description.*

That Polypragmatick *Johannes Colerus* (in the 18. B. of his *Oeconomy,* and 154. *Chap.*) gives us this Description.

Take *the fat of a Brawn, and of a Bear, of each half a pound; Moss of a Mans Skul, one pugil; Earth-worms, one quart; Blood-stone, two ounces; Red Saunders, and Root of the greater Consound, of each three ounces; mingle them, and with Wine make an Unguent.*

Neither do they all agree as touching the time wherein they would have this Unguent to be made. *Crollius* requireth the preparing of it, the Sun being in the Sign *Libra.* Others do include this time within narrower bounds yet; and they will have it to be only the tenth and eleventh day of *September.* But others there are that allow us any time for the providing of it.

But now as for the manner of using this Medicament; it having been so fully and largly described and set down before out of *Crollius,* I hold it needless here to repeat it.

The manner of using it.

The Sum is this in a word; the wound it self is not to be anoynted with this Unguent, but the weapon; or the instrument what ever it be wherewith the wound is inflicted: or if this cannot be had, then any other weapon, or wood, (but more especially that of the Sallow Tree) or any thing else put into the Wound, and there died and stained with the blood of the wounded person. And they likewise conceive that it matters but very little, (or not at all) whether the wounded party be present, or many miles distant; neither have they any regard at all unto the wounded person, but only unto the weapon, that this be anoynted. But yet nevertheless, some there are who give in charge likewise, that the Wound be every day washed and made clean with Urine or Wine.

But now lest any one should doubt of the effect of this Medicament; they first of all appeal unto Experience: and *Rudolphus Goclenius* the younger writeth that he is able to nominate Emperours, Kings, Princes, Earls, and Lords, (whose Authority and Credit was no way to be called in question) that

that were ready to give their testimonials touching the efficacy of this Unguent.

Reasons alleaged for their weapon-salve:

Moreover the Patrons of this Unguent think (as they tel us) that there may be natural causes rendered of this Action. And *Crollius* term al ignorant and simple that doubt of the efficacy of this Medicament, or that refer this Cure unto Sorcery. But now that they may prove that this Cure may be performed in a Natural way, they first of al take a great deal of pains to prove, that there are some actions to be instanced in, that are not wrought by the intervening of any Corporeal contact, but by an occult Sympathy, and *Magnetism* (as they call it.) And so the Load-stone draweth Iron, albeit that it touch it not corporeally; and it is moved toward the Pole. The Stars do also Act upon these inferior Bodies, without any the aforesaid Contact. The *Torpedo* or Cramp-Fish affecteth the hand of him that holdeth the Spear. There are some likewise that can by no means endure to be in the Room with a Cat shut up in a Basket; and although they see her not, yet they can by no means brook her presence; so that, unless either the Cat be carryed forth, or themselves removed into some other Room, they presently fal into swounding fits. Dogs likewise know their Masters foot-steps, as also the treadings and traces of wild beasts, by which they follow and pursue them. The shade of the Yew-Tree is very hurtful unto mankind. And very many more of such like instances and examples that may be observed in Nature, they heap up, to prove that there may be Natural occult Actions without any Corporeal Contact: which (because that they are most manifest in the Load-stone) therefore from it they cal them all in general Magnetick Actions.

Another thing that they presuppose and take for granted, is this, that there is a certain spirit of the world, diffused al the world over; which spirit (say they) is the Director and Vehicle of al occult powers and Actions; and which conjoyneth and keeps together all the parts of the world; and causeth a sweet and admirable agreement and harmony between them.

But Thirdly, As for what concerns the virtues of the Weapon-salve, they tel us that there is in it a two-fold virtue, one in the Unguent it self, to wit, of Consolidating and agglutinating of the Wound; and the other that that is in the Weapon anoynted, & which carrieth that power unto the wound. They derive this former virtue from many things of which this Medicament is compounded, and from the influence of the Constellations, as also the Astral and Elemental Conjunction. And therefore (as we told you before) some there are that never make this Unguent but at such a certain time of the yeer, and position of the Stars. But the other virtue they derive from the Natural Balsam, which together with the Blood sticketh upon the Weapon or instrument pressed upon the Wound, but first besmeared with the Blood of the wounded person. For this Balsam (say they) by reason of that Sympathy it hath with the Wounded part communicateth unto the Wound the said virtue of the Medicament, by the Mediation of the spirit of the World. And for the confirming of this they produce likewise other examples. The *Zenith* (as they term it) of young Maidens being cast into the fire (they say) very grievously hurteth the virgin from whom it came; and that the *Secundines* (or after births) if they be ill handled wil cause great damage and danger unto that Woman out of whom they flowed. Although they do not likewise here sufficiently and cleerly explain themselves. For *Crollius* writeth, that this Cure is performed by the Magnetick attractive virtue of the said Medicament caused by the Constellations; which virtue (say they) by the *Medium* of the Air may be brought unto the Wound, and conjoyned therewith: and then immediatly he addeth that there are three things that by this Medicament Cause so admirable an effect. 1. The Sympathy of Nature. 2. The influence of the Celestial Bodies, performing its operations by the Elements. 3. The Balsam, that being endued with a healing virtue is Naturally put upon any one whatsoever, without any distinction of either Person or Sex.

Reasons against the defenders of the weapon-salve:

But in very truth (that we may briefly open unto you, and shew you our Opinion touching this Unguent) that which in the first place rendereth it very suspicious, is this, that they give us not one only way for the composition of this Unguent but very many; and in some of them those things are omitted and wholly left out, from which others derive al the virture of this Medicament; as is apparent from the many descriptions above mentioned. And so *Wittichius* leaveth out of the Composition the *Usnea* or moss, the Fat, and Blood of man; which yet nevertheless others make the very Basis, and Foundation of all the virtue of this Medicament; and it is with them the principal part thereof. And yet nevertheless they will all of them promise you the very same effect: and every of them extolleth his own as fit and proper for al Wounds, whatsoever the Weapon be wherewith they

are inflicted; and whether they be by pricking, or by Cutting, or by any thing cast at the party, or by a fal; albeit that *Goclenius* indeed and *Crollius* do except those Wounds that are in the Nerves, Arteries, or any of the more principal Members, as the Heart, Brain, &c.

What others object against the Composition of this Medicament, to wit, that the Authors of this Unguent require the *Usnea* or Moss that is cut off from the Skul of a Man hanged, as also joyning therewith Mummy, Mans Blood a little warm, and Mans fat, and that in the Mans Blood and fat they think the marrow and pith of the whole business (that is to say, the whole virtue of this Unguent) to consist; which these Judg to be superstitious; this Objection I no waies own, neither will I defend it; it being so well known, that Mans fat, and Skul, Mummy, and *Usnea*, are made use of by other Physitians (without any superstition) in the Curing of Diseases. And yet notwithstanding of this I must here admonish you, that (seeing that Magitians and Wizards (as will appear out of *Apuleius* upon the 2. and 3. *B.* of *Ovids Metamorphosis*; and *Nicolaus Remigius*, in his 1. *B.* of *Dæmonolatry*, and 16. *Chap.* and 2. *B. Ch.* 1. and others also that have written of witches and Sorcerers) seeing (I say) that these are wont in their sorcery to use mans Blood and Flesh, and other parts of Mans Body, every one ought to be careful (who will make use of such Medicaments) that he do not superstitiously use the said Medicament, for the procuring of a Natural effect; and so thereby gratifie the Devil, (who is the enemy of Mans both Soul and Body) and so unawares do him Service; which may be done, if he use such Medicaments for those effects that are not in the Natural power of those things; and therfore if those effects shal follow, they are to be imputed and ascribed unto the Devil, (by such like superstitious practises laying snares for mankinde,) rather then unto the thing it self.

As touching the effect of this Medicament; that it doth not evermore answer the desire and expectation, we are shewn by *Guilhel. Gabritius*, in his *third Cent.* and 25. *Observation.* And be it so, that (as many great and eminent persons have testified) divers who have made use hereof have recovered: yet nevertheless these can atteſt no more but this, that the person was wounded, that unto him there was administred this kind of Cure by the Weapon-Salve, and that this person recovered: but that he recovered by the virtue of this Medicament, this they cannot testifie. For there may be oftentimes many things conjoyned with some effect, that are not the Cause thereof. And therefore, as it doth not follow, that such a person walking it Lightened, therefore his walking was the cause of the Lightening; so no more will it follow, this wounded person was healed, and he applied the Weapon-Salve, therefore the Weapon-Salve was the cause of the cure; unless it be demonstrated, that from the said Unguent this effect necessarily followed. And in nothing indeed is the fallacy of the cause more frequent then in Physick; where oftentimes the healing of some Disease is attributed unto this or that Medicament; whereas the truth is, it proceeded not from the said Medicament, but either from Nature her self, or else from such other Medicaments as were administred before, together with, or after the said Medicament whereunto the Cure is ascribed. And a very great difference there is between Physick and other Arts. For in other Arts the effect being upon somthing that is solid dependeth wholly upon the Artificer: and if there be any thing well or ill done by him, all this is to be imputed and ascribed unto the Artist, unless it so fal out, as happily it may, and often doth, that by reason of the unfitness of the subject matter, (for as we use to say, a Mercury or Statue is not made of every piece of Wood) or else by reason of some fault in the Instrument, somwhat may happen to be done amiss; since that, as we told you before (in the *first B. of our Institutions*, and 1. *Chap.*) the subjects of other Arts do nothing at all, but only obey the will of the workman: whereas in Physick, the subject matter thereof hath a certain innate power; by which (being assisted by the Physitian) for the most part of its own accord it tendeth unto health: from whence it is that by *Hippocrates* (6. *Epid. Comm.* 5. *Text* 1.) they are said to be the *Curers of the Diseases of Nature.*

So that the whol business in short comes to this, that the State of the Controversie here is not, whether in a person wounded, and recovered again, the Cure were done by the Weapon-Salve; but this, whether or no the Weapon-Salve were the Cause of the healing of the Wound; touching which we are now to make a little further enquiry.

Now it being so that Nature (as we shewed you above) is the Cause of the Wounds Conglutination, but without the virtue of any Medicament, (under what Notion or Consideration soever,) and that oftentimes likewise even by Lard (or some other thing of no great moment) laid on, many Wounds without the help of any other Medicaments, or any assistance from the Physitian, have been Cured; therefore, in the Cure likewise that is by some thought to be done by this Weapon-

Salve,

Salve, the Conglutination of the Wound is to be aſcribed unto Nature alone, as the next and principal cauſe. Which being ſo, and the truth thereof being ſuch that it cannot be denied, now in the next place we are to enquire, whether in the ſaid Cure the healing of the Wound be to be aſcribed unto Nature alone; or elſe indeed whether or no there be not likewiſe ſome Concurrent efficacy of the Weapon-Salve. Unto me the former ſeemeth the more probable, therefore, becauſe that it is a truth moſt certain (as but now we told you) that Wounds are oftentimes Cured by Nature alone without the Concurrence of any Medicament; the truth whereof is ſufficiently atteſted likewiſe by internal Wounds, unto which there cannot poſſibly be any Medicaments adminiſtred. And hitherto tendeth the whole buſineſs in the curing of Wounds (according to *Cæſar Magatus* his way, touching which we have ſpoken in the foregoing Chapter) to wit, that the whole work be committed to Nature, that the heat and temper of the part (it being the inſtrument) be kept entire, and that without urgent neceſſity it be not moleſted and diſquieted by Medicaments. And ſometimes we ſee that ſuch dangerous Wounds chiefly and eſpecially by the benefit of Nature, without the application of any Medicament, (or ſuch as is of no great moment) are cured; ſo that it ſeems to be aſcribed rather unto a Miracle, then the Medicaments. Of which very thing the Obſervations and Examples are every where ſufficiently known. Neither yet notwithſtanding are the Patrons of this Unguent ſo bold as to extend the virtue thereof unto al Wounds; for (as a little before we told you) *Crollius* and *Goclenius* do except the Wounds of the more principal Members, as alſo of the Nerves and Arteries: and there was never yet found any that durſt make uſe of this Unguent in Wounds cauſed by Gun ſhot. And who is there that dares deny that other lighter and ſleighter Wounds may be cured by Nature alone? And if any thing extraordinary, and that which ſeemeth to exceed the power of Nature, happen at any time in the ſaid Cure by the Weapon-Salve, we ought well to conſider, and look unto it, whether it be not wrought by the aſſiſtance of the Devil, thereunto engaged by a Compact and agreement, either explicite, or implicite.

And now therefore it being a known truth, that Nature alone (and as the next Cauſe) may agglutinate Wounds, and that Medicaments (as above we ſhewed you) do perform nothing elſe then the preſervation of the native heat, and the Natural Temperament of the part, or the removal of thoſe impediments that hinder Nature in her work; we are now in the next place to ſee, whether the Weapon-Salve can perform thoſe things.

Whether the Weapon Salve can Act at a diſtance?

Where we inſtantly meet with this firſt difficulty, to wit, whether poſſibly the Medicament that is not anoynted upon the Wound it ſelf, but upon the Weapon, or any thing elſe that is beſmeared with Blood from the Wound, can yield any benefit, eſpecially if the wounded perſon be abſent, and many miles diſtant from the anoynted Weapon. And indeed to prove this, they uſe two Reaſons, as we alſo told you formerly: the firſt is this, that there may be actions from occult and hidden qualities, and at a diſtance, (which they cal Magnetick actions) becauſe that by the ſpirit of the world the virtue of the Unguent may be conveyed unto the Wound, as we ſee it to be done by the Sympathy and Antipathy of many things.

But neither proveth the thing that it ought to prove. For firſt of all, albeit we grant that ſuch Actions there are, and that thoſe things that mutually Act, and are paſſive, do not alwaies corporeally touch one the other; yet nevertheleſs, that this is ſo in the Weapon Salve, and whether or no any virtue can be derived from the Weapon anoynted unto the Wound at ſo great a diſtance and interval of places, this is yet to be proved. For it doth not follow, there are ſuch admirable actions of other things, and therefore alſo the Weapon-Salve hath ſuch a vertue. And that this is not done, he ſhal eaſily perceive that will but conſider thoſe other Actions of this Nature, that are performed at a diſtance. Since that the operation followeth the being of a thing, it is therefore neceſſary that between the Agent and the Patient there ſhould be a certain conjunction and mutual Contact. But now, in regard that the things between which the Action is do not all of them touch one the other with their Bodies, there is a neceſſity that they ſhould touch in ſome other manner. And this is twofold: for

Action at a diſtance twofold:

either the thing that is ſaid to act at a diſtance, ſendeth forth ſomthing from its own Body and ſubſtance, (which the Ancients called *Effluvium* or Aporrhoia, and Phyſitians where they treat of Contagion, cal it *Miaſmos*; touching which ſee further in the *fourth B. of Feavers, Chap.* 4. and the 2. *B. of our Inſtitutions, Part* 2. *Chap* 12.) to wit, when there flow forth of the Body the ſmalleſt imaginable parts, and Atomes, and by the *Medium* of

the Air (or some other body,) are transferred unto another body, and affect it with that virtue which it hath in common with the whol entire body. But now as for such small bodies as these, they have no Regular motion at al, but according to the motion of the Air they move inordinatly this way and that way, and by every blast they are variously dispersed; like as we may see in the smoak of Candles when they are extinguished, and of other things when they are first lighted and kindled. But other bodies there are that Acting at a distance do not indeed send forth from their own body any thing that may be transferred unto another body, but only they send forth a *species* as we may call it; and in this manner, by means of these sensible *species*, as light, sound, smel, and the like, even the distant bodies are affected. And very probable it is, that there are more of these like sensible species then what are perceived by our senses. And this is commonly sayd to be done by a virtue, or virtual contact. And yet nevertheless virtue doth always presuppose a substance from which the said virtue floweth. So the flame being extinguished, the illumination or light that comes from it that also ceaseth. And moreover secondly there is likewise a fit subject required, thorow which it may be propagated; which if there be not, the Action ceaseth. And so an opacous and thick body being interposed betwixt the light body and our sight, the Illumination ceaseth. Thirdly, this virtue is likewise diffused orbicularly, and at a certain distance; Naturalists term it the sphere of Activity; which in some things is greater, and in others less. The greatest of all is in light or lucid bodies, but a less in those bodies that yield a sound. But yet the greater the lucid and lightsom body is the greater also is its sphere of Activity: and hereupon it is, that the starrs of all other bodies do scatter and disperse their light from them furthest in distance and widest in breadth.

We are now therefore to make enquiry (in regard that it is of a certainty that the Weapon salve with which the Weapon is anoynted, is in body absent and distant from the wounded party) whether the weapon-salve touch the Wounded body either of these two waies; for a third way there is none. Neither can this be done by Accident & some quality; since that an Accident doth not pass from one subject to another, neither diffuse it self at a distance, and unto any other body. Now I say that this is not done, neither indeed can be, either of these wayes.

The Weapon-salve doth not Act by sending forth any small bodies.

For first of all, those Atomes or Effluvious bodies that flow forth, having no certain motion of their own, but moving inordinately hither and thither, this way and that way, how can these possibly directly and in a straight line tend unto the wounded person? Neither is there any Cause, that we should here fly unto and plead the likeness of Substance. For although that those smallest bodies do at the length apply themselves unto others of their own kinds, (as we may plainly see in thunder and lightning) yet notwithstanding when they at first exhale out of the body they wander up and down inordinately, this way and that way. And much less may we have recourse unto the spirit of the World, by whose carrying and conveying whereof these smallest bodies may from the weapon anointed at length come unto the wounded person, and the wound it self. For those things are indeed spoken of the spirit of the world, but they are not proved; yea but rather they are opposed by reasons strong and weighty. And furthermore, since that this cure extends it self very far in length, and (as they will have us beleeve) at the distance of some miles; if this were done by the effusion of those small bodies, seeing there is so very little of the Unguent, and yet much less of that natural Balsam that sticketh unto the Weapon, that Unguent with the Balsam would easily fly abroad into the Air, and there vanish; and so the very foundation of the cure being taken away and gone, the cure it self must needs cease.

The Weapon salve doth not Act by any species,

But if they will say, that his Action is performed by the species, or Magnetick action, they ought first of all to prove that there are such species in this Unguent; (for indeed Nature hath given unto some simples and things natural, not compounded by art, a virtue of sending forth such like species as these we speak of) and then they must shew us what the nature of them is, and what their sphere of Activity. For it is no way credible, that the virtue of this Unguent should extend it self for twelve miles round about, and so orbicularly. As for what concerns the Loadstone, (from which they are wont to term these magnetick actions) the Load-stone doth indeed attract the Iron although it be at some distance from it; but if very far removed, and beyond the sphere of its Activity, it doth not attract: and the very same is likewise well known, to be done in other such like occult and magnetick Actions. For the Loadstone, and other the like bodies, do put forth their virtues

tues in a ſtraight and direct line, which yet nevertheleſs are not extended *in infinitum* (as we ſay) and they are oftentimes likewiſe intercepted by the interpoſing of other things. So the Sun-beams by the coming between of an opacous body are excluded. Who then can believe, that from ſo ſmal a pittance of the Unguent, and ſo little of the blood, there ſhould break forth ſo many of theſe ſmall bodies or ſpecies, thorow the cheſt in which the anoynted weapon is ſhut up, and that they ſhould thence be carried ſo great a diſtance, (even twelve miles) that they ſhould penetrate thorow Mountains and Walls, and tend directly unto the wounded perſon cloſe ſhut up within his Chamber, or in bed, and that there they ſhould paſs throw thoſe many double ſwathes wherein the wound is wrapped, and ſo inſinuate themſelves at length into the wound it ſelf? The Loadſtone is moved unto the Iron; but this unguent is not anoynted upon the Wound, but upon the Weapon. And the Loadſtone indeed being but only moved toward the Iron, draweth it; but now in the right uſing of this unguent, what a company of Ceremonies and ſuperſtitious practiſes there are uſed we have ſhewn you before. And in other reſpects alſo there appeareth a very vaſt difference between the Loadſtone and this Weapon ſalve. The Loadſtone is a natural body and ſo hath its Natural Effect, which evermore worketh in one and the ſame manner. The Weapon ſalve is a Compoſition out of many things; and by ſome it is made one way, and by others after a different manner, and of other things, as before we have ſhewn you. And the Unguent ought alſo to effect many things, to wit, perform all thoſe things that are Neceſſary for the curing of the wound, preſerve the Wound free from pain, and likewiſe bring pain upon it if it be not rightly preſerved, or if it chance to be defiled. For if it ought to perform all that that is otherwiſe the work of Nature in the curing of Wounds; there will be then altogether a neceſſity that it perform many things; to wit, that it concoct whatſoever is to be concocted, that it expel the *Pus* and excrements, and that it generate fleſh. Yea moreover it ought to perform the office both of the Phyſitian, and alſo of the Medicaments, which is indeed very various. For neither are all thoſe bodies that are Wounded alike diſpoſed; ſome of them being ſound bodies, others Plethorick, and a third ſort Cacochymical; the parts likewiſe are various, as fleſh, Nerves, Membranes; which require Medicaments of a different kind; the virtues of all which this unguent ought to ſuſtain. And if a man ſhall at one and the ſame time (as it very often happeneth) receive divers wounds in different parts of his body, and from different weapons; the queſtion then wil be, whether it be ſufficient to anoynt one of the Weapons only, and whether or no the virtue thereof wil be conveyed unto al theſe ſeveral wounds; or whether or no all the weapons are to be anoynted; and whether each particular unguent wil do its own office, and this tend ſtraight and directly unto that wound that was inflicted by this weapon; and that unguent likewiſe unto another wound made by that other weapon?

A reaſon ſhould likewiſe be rendered why the unguent ſhould not perform the ſame while it is in the box, which they ſay it performs when it is anoynted upon the weapon. For they have no ground to ſay that by the benefit of that baliam that is in the blood the virtue of the Medicament is carried and conveyed unto the wound. For if all that whol blood were reſolved into Atomes, it would not be ſufficient to fil up all that ſo great a ſpace. Neither have they as yet proved, that the blood can ſend forth out of it ſelf any ſuch ſpecies. And if by the benefit of the blood the virtue of the Medicament may be carried unto the wound, why ſhould it not then likewiſe carry to the wound the virtues of other things, into the which out of wounded perſons the blood is oftentimes abundantly poured out, which yet we ſee that it doth not.

But now as for thoſe things that they alleadg in ſpecial couching the Secundines, and the firſt menſtruous blood of Virgins, and as for their aſſerting that if this blood be not rightly handled, there is much hurt and damage brought unto thoſe maydens, theſe things are to be imputed unto the ſuperſtition of theſe young Women. And if in woman kind the Secundines being caſt forth into ſome unclean places bring damage unto theſe women from whom they came, why is not the like done in bruit Creatures, whoſe Secundines or afterbirths being caſt forth and buried in dung do oftentimes putrefy? And in what place ſoever you dig and bury theſe ſecundines, they yet notwithſtanding rot and putrefy. And why alſo do not the *Molæ* (or falſe conceptions) which women uſe to burn, bring any hurt and damage unto the Woman from whom it proceeded? And why ſhould the firſt menſtruous blood if it be burnt bring damage unto the virgin, and none of the reſt?

Theſe things being as we have ſaid, and the caſe thus ſtanding, there is no need of any further tedious diſpute touching thoſe virtues that this unguent is ſaid to have in curing the Wound, ſeeing that it is hitherto

ſufficiently

sufficiently proved, that there cometh no virtue at all from this Unguent unto the Wound. And if this Unguent had indeed any virtue at all in it either of preserving and cherishing the temperament or the innate heat of the part (they commonly cal it the Balsam) or of drying up the Excrements, it would better and more commodiously exercise and put forth this virtue, being anoynted upon the wounded part it self, then upon the Weapon. And besides all this, if (as some will have it) the virtue and strength of this Medicament consist in the Blood and fat of Man, why then do some of them likewise apply it unto the Wounds of other living Creatures, to wit, of Horses, &c.? For how great is the Difference between a Man and a Horse?

But that *Crollius* and some others (that I may not here altogether omit the mentioning of this also) derive the vertue of this Medicament from the Heaven, and therefore command the preparing of it in such a certain position of the Heavens: Neither will that at al patronize this Cause. For they have not as yet proved, that there is in the Heavens or any of the Stars any virtue at all to heal Wounds; or that if there were any such virtue in these, that it doth so mingle it self with this Unguent, that as if it were in a manner bound and shut up, it may be carried up and down about with us, and drawn forth into use and Act when we please.

And so likewise as touching the manner of using this Medicament, this also hath no Foundation to uphold it, neither doth it want for superstition. For first of al, seeing that they place the whole Cause of the Cure in this, that the virtue of the Medicament is derived unto the Wound by the benefit of the natural Balsam that is in the Blood; why then do they anoynt only the Weapon with the which the man was wounded, or some other Weapon, or a piece of Wood bloodied with the Blood of the Wound; and why do they not as well anoynt his shirt, or the other Garments of the wounded party, or a Stone, or any thing else what ever it be upon which the Blood hath been spilt or poured out: and if not, there is then some implicite underhand compact with the Devil to be suspected. And moreover, why if the wound be made with the pricking of a Sword do they anoynt the Sword in the point thereof towards the hilt; but if the wound be made by the Cut of a Sword, then they anoynt it from the edge towards the back: and if it appear how far and deep the Sword penetrated into the wound, so far they anoynt it, and no farther; but if it doth not appear how far it pierced, they then anoynt the Sword all over: all which are no better then Superstitious Ceremonies, and of which no Reason can be rendered. For if the power and faculty of the Medicament be Natural, what doth this or that manner of using it in the anoynting make to the thing it self, and whether or no doth it add any new virtue and quality thereto? If the vertues be Natural, there is no need of any such Ceremonies; as it plainly appeareth in all Natural things whatsoever. The Load-stone draweth the Iron; and the Iron being touched with the Load-stone is moved unto the North-pole, without any of the aforesaid Ceremonies. And furthermore, some there are that anoynt the Weapon once every day, others every Second, or Third day; and some content themselves with once only anoynting. And some there are, who (that so they may not Erre in the anoynting) wholly dip and plunge the Weapon (or Sallow Wood, that now and then serves in stead thereof) into the Unguent kept in a long Box, or little Chest, until the Wound be perfectly healed; but they altogether neglect the Weapon it self, that dip the Arms (or that they make use of in their stead) all over in the Unguent. But others there are that keep the anoynted Weapon in any temperate place what ever it be; and others likewise shut it up in a little Chest. But al of them generally are exceeding Cautious in this, that the Weapon be never kept in any place that is over hot, or over cold, and that it be not polluted with filth and impurities: for if this should happen, the Cure will by this means be hindered, and a most grievous pain in the Wound procured unto the sick person: All which are meerly frivolous and superstitious. For seeing that (as it is before sufficiently proved) there cannot possibly be any action of the Weapon-Salve upon the wound at a far distance, and interval of place from the Wound; so likewise we say, that it cannot possibly excite any pain. And therefore we conclude, that if this at any time happen, it is then caused and procured by the help and assistance of some evil spirit. And most certain it is, that the Blood of wounded persons is not alwaies poured forth into clean places, but oftentimes into places very noysom and unclean; and that in the Winter time it is frozen; and that the Bloody Linen Clothes are washed with warm Water, and the wood be sprinkled with the Blood oftentimes burnt, and yet nevertheless the sick person doth not hereupon feel any pain, or suffer any damage whatsoever.

And furthermore we say, that they attribute unto this Unguent things altogether impossible,

possible, and those virtues all which are never to be found in any one Natural Medicament. For they affirm that by this Unguent may be Cured all wounds whatever, whether inflicted by downright cutting, or pricking, by a fal, or any thing cast at the party. But great is the diversity of Wounds according to the various Circumstances that attend them; and therefore there is not required one only Medicament, but divers Medicaments are required unto the Curing of them. A Wound inflicted by a sharp and keen Weapon is Cured without the generating of much *Pus*: but in that which is from a blunt Weapon, whatsoever is bruised must of necessity al of it convert into *Pus*. And there is also an exceeding great difference of the parts. In a fleshy part (especially, when the man is of a sound and healthy Constitution) the Wound is easily Cured; but much harder is that Wound to be Cured that is inflicted upon the Brain, Nerves, Tendons, and Ligaments, (especially the greater ones) such as are those in the Hams. They promise the Patient likewise that the Cure of the Wound shal be altogether without pain: which in all parts to perform is a thing altogether impossible. For certainly if a Nerve be prickt, there is no man that can make good his promise, that here in this no pain shall afflict the Party.

And that we may now conclude whatsoever may be further said in this Controversie; the Curing of the Wound that is ascribed unto this Weapon-Salve, (as hath been said) is for the most part to be attributed unto Nature, whose work alone it is to Cure not only light and trivial Wounds, but oftentimes also Wounds most grievous and ful of danger. Which appeareth even from this, that there are so many several descriptions given us of this Unguent; and that there have been some, who instead of this compound Weapon-Salve have made use of Lard only, or Hogs fat, and yet notwithstanding the Wounds have been Cured; which *Johannes Colerius* testifieth (as before we alleadged him) that he himself had seen; as we may find it in the before cited place of his *Oeconomicks*. But now, if upon the administring of this Medicament some most grievous Wound shal be healed, which may seem altogether to transcend the power of Nature, this cometh to pass by the power of the Devil himself, drawn thereunto by some compact either explicite or implicite. Neither is the suspition hereof any wales to be lessened, or removed, by what is said by some, to wit, that all the simples that make up the Composition of this Medicament, Unguent, or (as it is commonly called,) Weapon-Salve, are all of them altogether Natural; and that in the Composition hereof, or the anoynting therewith there are neither Characters, nor Conjurations, nor Charms and Inchantments made use of. For the Devil doth oftentimes hide and conceal the Compact that he makes not only under Characters and Consecrations, or a certain form of words, but likewise even under things Natural, if at his command (which is done indeed in the first and explicite Compact, wherein others that administer and apply the same things implicitely and inconsiderately may likewise involve themselves) things that are Natural be made use of for other purposes then what they were Created for by God; and oftentimes Diabolical and Magical Actions are concealed and obtruded under the veil of Magnetick Actions. And therefore, although it be granted, that by this Unguent the wounded person is healed (which yet nevertheless is, as we have said, wrought by the benefic of Nature) yet it is not impossible, but that the Devil, that he may destroy the Soul, by Gods permission in many things may help the Body after a certain manner: yet it is very Credible, in regard that he is the implacable enemy of Mankinde, and evermore ready and provided to do them all manner of hurt and mischief, that he may seduce and draw men (as far as lieth in his power) from God the Creator, and Author of all good; and from the Means by him ordained, unto things superstitious, and unwarrantable practises.

Chap. 11. *Of Altering Medicaments, and Vulnerary Potions.*

WE told you before, that there are two sorts of Medicaments that are made use of in the Curing of Wounds, external, and internal. Touching the external we have hitherto spoken; we will therefore now in this Chapter handle the internal. Now those are of two Sorts; some only altering, and some in special called vulnerary. Altering Medicaments, are Coolers, Thickners; and such as are but lightly (lest they might otherwise breed obstructions) Astringent: which are to this end administred, that they may hinder the Humors that they easily wax not hot, become fluxile, and receive a putridness. And such are made of *Succory, Endive, Sorrel, Plantane, Tormentil, Roses, Purslane, Water Lilly, Borrage, Saunders, Juyce of Citron, Juyce of Pome-Granates, Harts-Horn, Margarites, and Coralls*: out of which there are made Decoctions, distilled Waters, Syrups, Electuaries, and Potions.

And

Whether Vulnerary potions are to be made use of.

And moreover there are made use of certain Medicaments, potions more especially, that are termed vulnerary. Touching which notwithstanding Authors differ amongst themselves. For some of them (among whom is *Balduinus Roussæus*, in his *Medicinal Epistles*, *Epist.* 66.) do indeed admit of them in those wounded parts unto which these kinde of Potions do reach, as the Gullet, Stomack, and Intestines, and then they have in a manner the place of Topick Medicaments; but in the external parts they reject them, for these Causes.

The Negative.

First, Because that in the writings of *Hippocrates* and the Ancient Physitians they finde no mention made of these vulnerary potions. Secondly, because that by Reason of the distance of the Scituation, they will not beleeve, that these potions can possibly penetrate unto the extream Limbs, or the Head; nor yet unto the greater and thicker Guts, unto which therefore when they are wounded Medicaments may more commodiously be injected by Clysters, then given to drink; yea they conceive that those Astringents that for the most part are mingled therewith may hinder that those Medicaments may not penetrate unto the more deep and inward parts. Thirdly, Because that there is a great difference between the Medicaments out of which these potions are prepared; since that some of them are hot and opening, as *Betony*, *Speed-well*, *Mug-wort*, *Avens*, *Carduus Benedictus*, &c. as also Cold, and Astringent, as *great Comfrey*, *Winter green*, *Horse-Tail*, *Burnet*, *Tormentil*, &c. So that it doth not sufficiently appear of what faculty the Medicaments ought to be, out of which these potions are prepared, and what virtues these potions have in them. Fourthly, whenas yet notwithstanding they are most of them Astringent, they think that being administred they bring more hurt then good and benefit unto the Patient; in regard that they obstruct the Liver and the other more noble bowels.

But in very truth, it is not indeed to be denied, that among the more Ancient Physitians (to the best of my Remembrance) we scarcely meet with any mention made as touching these Medicaments: and yet among the Physitians of latter times very frequent and common hath been the use of them. And yet nevertheless those things that *Galen* hath in the 5. of his *Method*, *Chap.* 9. touching potions in Wounds of the Thorax, those things (I say) seem to come very neer unto these, and to suit and answer unto these potions. And the Author of the *B. de Dynamidia*, *Tit. de Plaga*) maketh mention of these potions; who administreth out of Wine *Mouse-Ear*, *Plantane*, *Strawberry Leaves*, *Avens*, *Pimpernel*, *Ground Ivy*, *Betony*, *Agrimony*, And in his Title, *touching the Curing of Wounds*, he prescribeth *Mouse-Ear*, *Agrimony*, *Ground Ivy*. And in the Antidotary of *Mesues*, *about the end of the* 11. *Distinction*, after the Emplasters, there is extant such a potion.

Take *Avens*, *Root of Mug-wort*, *Pimpernel*, *Camomile*, *five leaved Grass*, *Black French Horehound*, *Violets*, *Hemp stalks*, *the tender tops of the Bramble bush*, *of each one handful*; *Madder*, *according to the weight of al the other*. *Let all these boyl in Wine unto the one half*; *and afterwards let them be strained*; *unto the straining add a third part of Honey*; *and then boyl them again*, *and strain them*.

The truth is, *Christophorus Georgius* (in his *Comment.*) writeth that this Medicament is no where to be met with in Ancient writings, or Books; and *Johannes Manardus* (in his *Comment upon this place*) writeth that he knew not by what accident this mixture had crept into this place, and that the potion was added unto the Emplasters. And yet nevertheless, the same *Christoph. Georgius de Honestis* confesseth (in the *same place*) whether it be *Mesues* his potion, or any ones else, that it is to be found described in many other Authors: and *Johannes Manardus* (in the same place) writeth, that these kind of Potions are very useful both for new and old wounds; and that he himself had more then once made trial of them; and that with them alone he had cured the worst and most desperate Ulcers. And these have been likewise used by others, and those not only Empiricks, but also most learned, able, and skilful Physitians and Chirurgeons; *Guido* (part 2. of his little Chirurgery, Chap. 9. *John de Vigo*, *Lib.* 3. *Chap.* 10.) *Johannes Anglicus*, *Nicolaus Massa*, *Epist.* 38. *Johannes Tragant.* *B.* 2. of his Chirurgical Institutions. *Johannes Andreas a Cruce*, *of Wounds*, *Tract* 2. *B.* 4. *Chap.* 4. *Faliopius*, in his *B. of Wounds*, *Chap* 24. *Petrus Andreas Matthiolus*, in his *fourth B.* upon *Dioscorides*, and *Chap.* 16. *Ambrose Parry B.* 18. *Chap.* 28. *Hieronymus Fabricius ab Aquapendente*, in *B.* 2. of his *Chirurgery*, *Chap.* 23. *Ludovicus Septalius*, in his 8. *B. of Medicinal Animadvers. Num.* 181. And others (a great many more of them) whom experience taught, that these potions were exceeding useful in the Curing of Wounds. And therefore, to oppose and thwart experience, and to reject, or neglect Medicaments approved of by long use and practise, it is a thing no way fit to be done. For as *Galen* writeth (in his 5. *B.* of the *affected places*, and 3. *Chap.*) *It is better* (saith he)

he) *to seek out how things that are done are wrought and affected, then to deny that they may at all be done.* Neither is this sufficient for the rejection of Medicaments, that there hath bin no mention made of them in the Books of the Ancients; for many most useful Medicaments have been found out by those of latter times, that the Ancients were altogether ignorant of. Neither are they administred for that end that Topicks are, or those potions of which *Galen* maketh mention, in his 4. B. of the *Meth. of Curing, Chap.* 7. And therefore albeit that they do not externally reach so far as the wounded parts, as other Topicks; yet nevertheless, they may through the Veins penetrate even unto the very Wounds themselves. Neither by Reason of their astringent virtue which certain of them have from those Medicaments is there any cause to fear that therefore they cannot penetrate unto the exterior Members; or that they are likely to breed obstructions in the Bowels. For this inconvenience may easily be Remedied and avoided by the admixture of other things that have in them rather a power of opening, then binding. Neither lastly, are the virtues of all Medicaments to be valued only from the first qualities, and such as arise from, and depend upon them; but from the properties that arise from the whole substance, which are suggested unto us only by experience. But now the virtues of these Medicaments, although they cannot easily be defined, but may be manifested by experience; yet notwithstanding in this all Authors agree among themselves, that these ought not to be made use of in the beginning, and when there is as yet no danger appearing by reason of the Wound, and that Topicks are sufficient for the ful and perfect Cure; as likewise where there is present a fever and an Inflammation; which by the use of these (they being for the most part hot) may easily be augmented: but as for other Causes so especially for this; to wit, the vitious Constitution of the part, Wounds oftentimes do not easily receive a Cure; and thereupon it is that they may happily and succesfully be made use of, not only in Wounds, but likewise in Ulcers and Fistula's. For it is a thing that is very much Material, how the wounded part and the blood therein are disposed; and what things soever they are that hurt the Wound, they all of them are for the most part communicated unto the Wound by the fault of the Blood; as *Tragautius* tels us in the 2. B. of his *Chirurgical Institut. Chap.* 12. And it being so, as we see, that some kind of meats are more fit and Convenient for wounded persons, and some again offensive and hurtful; why may we not therefore give the Patient to drink such Medicaments as cause that all things in the Blood and about the affected part may be rightly disposed, and in good order? Touching which, *Ambrose Parry* (in the *place before alleadged*) thus writeth: *Nature being assisted (saith he) by such a potion, hath often seemed to me to work effects wonderful and Miraculous, in the recovery of bones rotten and impostumated, and the Consolidation of Ulcers. For these potions albeit that they do not by the Belly purge away the Noxious and offensive Humors; yet nevertheless they are very efficacious in the cleansing of Ulcers, and the preserving and freeing of them from all that filth of the Excrementitious Humors, the defecating and carrying away the dregs of the Blood, and the purging of the Wound from the thin Ichorous Excrements, and all impurity; in the agglutinating also of broken bones; and the restoring of the Nerves unto their pristine Union. And presently he addeth this further; by this admirable and laudable Medicament the flesh and any other substance that is lost and perished may readily be restored and made good again, and the part restored unto its former Union. And* Pet. Andræas Matthiolus (*in his* 4. B. *upon* Dioscorides, Chap. 16.) *saith thus: By such potions I have seen healed as wel the Wounds of the Thorax as those of the Intestines, which were thought to be mortal, and altogether incurable by any help and means whatsoever.* And this these Medicaments do altogether and without fail perform, to wit, that they consume the excessive humidity of the blood that is wholly unfit for agglutination; that they supply a due and fit matter for the generating of flesh; and Thirdly, that by their moderate astriction they prevent and hinder the afflux of humors unto the wounded part. And *Guido* of *Gauliacum* (*Tr.* 3. *Doct.* 1. *Chap.* 1.) writeth thus in the stile of his Age: *In Ancient Ulcers* (saith he) *in case of any parts Fistulated and Cancerated, as also in Blood congealed in the interior parts, and in case of* Sanies *gotten together in the Breast and Intrinsecal Glandules, and in Croakings of the Guts, I have somtimes used these potions.* And out of him the very same hath *Johannes Tragautius* (in his 2 B. of *Chirurgic. Institutions*) and *Johannes Andræas a Cruce* writeth very confidently, that in these cases he himself was wont to make use of these potions; and most of all in Wounds of a long continuance, when they have come to be Fistulated, and refractory against all other Remedies. And *Ludovicus Septalius* (in the *place alleadged*) writeth thus: *When we once perceive (saith he) that great store of excrements are from day to day generated, either by reason of Errors committed in point of Dyet, or by reason of the overgreat abounding of*

naughty and vitious Humors in the whol Body, or else by reason of somthing amiss and faulty in the Wound; the Body being first evacuated, and the time of the Inflammation passed over, we thought good oftentimes to make use of some vulnerary potion for many daies together, until we saw that the matter was wholly consumed.

Now the simples out of which they are made and prepared, are divers, *Johannes Andræas a Cruce* writeth that there are only four Herbs that may be extolled and commended for this use, to wit, *Ladies Mantle, Avens*, the Herb *Periwinkle*, and the *Herb Trinity*, which is a species of *Trifoyl* or *three Leaf Graß*. But indeed there are many more Plants in use for the making of these potions; to wit; *The greater and leß Consound; Sanicle*, Saracennical *consound, Agrimony, Winter-green, Speed-wel, Mug-wort, Plantane, Savine, Horse-Tail, Adders Tongue five leafed Graß or Cinquefoil, wild Tansey, Vervein, the Red Cabbage, Neep or Neppe, (some cal it Cat Mint) Golden Rod, the lesser Centaury, St. Johns-wort, Tansey, Vipers Bugloß, Rupture wort, Water Germander, Straw Berry Leaves, the Roots of Tormentil, Pimpernel, both the Aristolochies or Birthworts, white Dittany, Valerian, Bistort, Gentian, Rubarb, Rhapontick, the Flowers of Lillies of the Vally, of St. Johns-wort, and Roses, Crabs Eyes, Sperma Ceti (commonly called Parmacitty) the Lentisk Wood, Mummy, Mace, Bole-Armenick.*

The Materials of vulnerary potions.

Of these there are made divers Compositions, but more especially potions and pouders And yet nevertheless in the preparing of these there is in the general to be observed; to wit, that those Plants which are appropriated unto the wounded part or the parts nigh unto it (as for instance, in the Wounds of the Head, *Betony, Roses*; in the Wounds of the Breast, *Speedwell*; in the Wounds of the Liver, and about the Liver, *Agrimony*; in the Wounds of the Reins, or about the Reins, Straw-berry leaves) are to be made choice of.

Potions.

Take Red Mug-wort, one ounce; Leaves of Tree Ivy, the Herb Winter-green, the greater and leß Sanicle, Ladies Mantle, Saracennical Consound, of each one ounce; Daisies, half an ounce; let them be cut smal, and infused in half a pinte of the best Wine, and cleer running Water, one pinte and half: let them stand in the Balneum shut and close covered, by the space of three hours, in the heat: and then after this let them be taken forth, and stand all night: in the morning add, Sugar four ounces; Nutmeg, Crabs Eyes Mummy, of each two drams; and make a potion. *Or,*

Vulnerary potions.

Take Ladies Mantle, Sanicle, Saracennical Consound, wild Ivy, red Mug-wort, of each one handful; pour in unto these four measures of the best Wine; boyl them in a close pot over a gentle Fire, until the fourth part be consumed and wasted away. *Or,*

Take Winter-green four handfuls, the Leaves of ground Ivy three handfuls, the Roots of white Gentian four ounces; when you have cut them smal, put to them of old stale Beer as much as will suffice; let them stand al night, and afterwards destil them. *Or,*

Take Sarracennical Consound, (all of it, both Root and Leaves) one handful; boyl them in good Wine, until a third part be wasted away; and give the Patient Morning and Evening a draught of this to drink. *Or.*

Take the Herb Tormentil, Straw-berry leaves, Sanicle, Matrisylva or Ladies Bedstraw, and Winter-green, of each one handful; boyl them in beer, and give it the Patient to drink. *Or,*

Take Herb Winter green Herb Periwinkle, the Herb Bugle, Mug-wort, Pimpernel, and Agrimony, of each two handfuls; boyl them in Wine unto the one half; and give the wounded person a draught of this Mornings and Evenings. *Or,*

Take the Lentisk Wood, and Oake Missletoe, of each two ounces; the Roots of Consound, Aristolochy, Centaury, Valerian, Madder, Tormentil, and Bistort, of each half an ounce; Common Water Chalibeated, (that is to say, wherein steel hath been often quenched) six quarts; mingle them, and make an Infusion according to Art for twenty four hours; and afterwards let them boyl in a double Vessel, until the one half be wasted; and when in the boyling it is come to the third part, then add of Parsley Roots, the tops of the Bramble Bush, Hemp, Mous-Ear, Herb Trinity (a species of Trifoyl or three leaved Grass) Herb Climer or Periwinkle, Horse-Tayl, Straw-berry leaves, Flowers of Valley Lillies, of each half a handful; Rhapontick, two drams; Cinnamom, half an ounce; but in the end of the Decoction add of Aromatick Wine, three pints; and then having pressed forth the liquor, and strained it, with Sugar make a sweet and pleasant drink. *Or,*

Take *Guajacum Wood prepared four ounces; the Rinds of the same Wood, and Sarsaparilla, of each two ounces; Citrine Saunders, and Tormentil Root, Bistort Root, Valerian Root, white Dittany Root, and Consound Root, of each half an ounce; Common spring Water, two Gallons; mingle them, and make an Infusion according to Art, for twenty fours hours; after this let them boyl in a double Vessel, unto*

the

the consumption of the third part; and then add, of Horsetayl, Betony, Mousear, Cretan Dittany, Wintergreen, Wild Tansey, topps of the Bramble bush, herb trinity, and Strawberry leaves, of each half a handful; Cinnamom half an ounce; let them boyl together, until there remain three Quarts; and in the end of the boyling add of the best White Wine, three pints; and then making a strong expression of the liquor, and straining it, make thereof with hony or sugar a sweet and pleasant drink for the Patient. But if the Wounded person should have a fever hanging upon him you must then leave out the Wine in the aforesaid decoction.

The following Potion likewise of the Nobles of *Berine* is very much commended; by which alone (as it is commonly reported,) the most grievous wounds are oftentimes cured; of which mention is likewise made by *Guilhelm. Fabricius*, in his 4 Century, *Observat.* 84.

Take *Wintergreen, Golden rod, Mugwort, Sanicle, Red Beets, of each as much as you think good: the Plants are to be gathered in the Month of* August, *then dryed in the shade, and afterwards beaten into a pouder; take equal parts of the powder and mingle them*; then,

Take *Of this pouder one spoonful; let it boyl in one measure of White Wine: give the wounded person a draught of this blood-warm, thrice a day; and so continue it until the consolidation of the Wound; Give the Patient (if he be weak) two spoonfuls hereof.* Aanother Potion.

Take *Clary, Wintergreen, Periwinkle, Sarracennical Consound, Ladies bedstraw, Sanicle, Speedwel, Ladies Mantle, tree Ivy, Mugwort, of each three handfuls; Album Græcum (or if you will, white Dogs-tird) pickt up in the month of* March, *two ounces and half; old beer a little tart and sourish, the proportion of one little earthen Cup; let them stand digesting for fourteen daies; and afterwards let them be destilled; and reserve it for use in glasses wel and close stopped: of this you are to give three spoonfuls at a time, thrice every day.*

And for this use and purpose there are likewise powders to be provided.

Pouders. Take *Nutmegs one ounce; Crabs Eyes one ounce and half; make a pouder; and give half a dram, or a dram at one time with wine.* or,

Take *Red Corral, three drams, Margarites, Spodium, of each six drams; Crabs eyes two ounces, Mingle and make a powder. Give unto the wounded person of this powder one dram at a time in Wine or Water.*

And such like Electuaries may be provided likewise: As,

Electuaries. Take *Conserve of Red Roses, and Betony of each two ounces; Tormentil and Consound, of each one ounce; Mace two drams; Red corral one dram; Crabs Eyes prepared half a dram, and with the syrup of sorrel make an Electuary.* or,

Take *Juice of Plantane, Horstayl Sanicle, Mouseare, Speedwel, of each two ounces; the greater Consound roots rosted under the embers and passed thorow a hayr sieve one ounce; white Sugar one pound; boyl them to the Consistence of an Electuary; and in the end ad Conserve of Roses one ounce; Tormentil half an ounce, and mingle them.*

And yet nevertheless, we are not so to trust and confide in those potions, as to neglect al other Topical Medicaments. For if we should thus do, the Wounded person may possibly fall into some great danger and hazard; of which we have a very remarkable history in *Guilhelmus Fabricius* his 4 *Cent. Observ.* 83.

Chap. 12. *Of the Dyet of Wounded persons.*

The Diet of wounded persons. And thus much may suffice to have been spoken touching the Chirurgical part, and the Medicaments Necessary in general for the curing of Wounds. It remaineth now that we speak some what of the Dyet that is to be observed by wounded persons. Let the Air be temperate, or a little inclined to Warmth; touching which *Celsus* (in his fifth Book. Chapt. 26.) thus; the *Place (saith he) in which the wounded person shal lie, it ought to be somewhat warm.* But a cold Air is greatly hurtful and an enemy unto all Wounds. And although that a hot Air be convenient enough for the wound; yet in regard that it heateth the body, moveth much the humors, and rendereth them fit and apt for motion, and so may easily give an occasion for fluxions, which are otherwise too apt to happen in Wounds, therefore it is not fit and allowable for wounded persons: touching which *Celsus* thus, in his fifth Book, and *Chapt.* 26. *The most opportune time (saith he) for the cure is the spring; or at least, that time that is neither fervently hot, neither yet over cold. For the truth is that both overmuch heat and too much cold, they do both of them infest and offend Wounds.* But now if such an Air may not be had that is naturally such, it is to be made such by the help of art. Let the Air be likewise pure; and that which is stinking, or any ways impure is carefully to be avoyded.

The food of the Patient.

And as for the meat and drink of the Patient, (since that from the blood both the flesh and whatsoever else is Necessary for the agglutination of the wound is generated) they ought to be such from which good and pure blood may be bred; and such as may not afford the least occasion and matter for many excrements, and dangerous Symptoms But meats of an ill Juice must heedfully be eschewed, such as Garlick, Onyons, Swines flesh, Pease; and the Patient must altogether abstain from meats that are hot, sharp, tart and biting, and of an ill Juice; and he may only feed upon those meats that yield a good Juice, and are of easy concoction. And let the food he takes be such for the quantity thereof that it may be concocted by Nature and such as may supply a moderate quantity of blood. For if too great abundance of blood be generated, it supplyeth matter fit for fluxion, inflammation, and other symptoms. And indeed his food that he taketh ought to be in such a quantity, that there may flow unto the wounded part so much blood as was wont to flow thither while the part was sound and without any distemper; seeing that the wounded part if it be rendered weak and infirm is not able to concoct and assimilate so great a quantity of blood as it did before; whereupon there wil be generated either an inflammation, or great store of excrements, and so the wound wil be made overmoyst. Let his meats likewise in the general be so ordered, that they may restrain the flux of humors, rather then excite it; & they ought to be altogether such, that if there be any thing amiss in the blood, and humors, it may rather correct then further augment the same. And if any evil accident shal befal the Wound, all indeavour ought to be used, that so the food may oppose and withstand the same. And yet nevertheless it is not one and the same kind of dyet that is fit and proper in all wounds. For if the wound be in a fleshy part, and that there be no danger of an Inflammation, then a more plentiful dyet may be allowed: but if the wound be in the Nervous parts, and that there be danger at hand of an inflammation, then a more spare diet is to be prescribed, that so there may flow unto the wounded part the less store of blood, and the matter of the inflammation may be withdrawn and kept back. And indeed, by how much the danger in the wound is the greater, by so much the more spare ought his diet to be: but so soon as the danger of the wound is diminished, then his diet may be by degrees augmented, so that he may feed somwhat more fully, but yet stil with a due moderation. And therefore, albeit that *Hippocrates* (in his B. of *Affects*) saith, that *Wounded persons ought* to be pinched and *afflicted with hunger*; this is not simply so to be taken; but that we are alwayes to heed the danger of the wound, and especially of the inflammation conjoyned therewith; and according as this danger shal be greater or less, so the diet prescribed may be more ful, or ought to be more sparing, as we may see out of the same *Hippocrates, in his Book of Fractures, comment* 1. *Text.* 44. *and Comment.* 3. *Text.* 12. *as* also out of *Galen*, in his Commentary upon those Texts of *Hippocrates*. But yet notwithstanding there is some consideration and respect to be had unto the Age, time of the year, Region, Custome, and Temperature, according to that 17. Aphorism of the first Section.

His Drink.

As touching the Patients drink; in our Regions Beer may fitly and conveniently enough be drunk; I mean, that drink that is made either of Barly or of Wheat: and this is to be made somtimes weaker, and somtimes stronger, according to the state and condition of the wounded party, and the wound it self. Wine is not allowable in those wounds that are dangerous, and where there is present, or the danger of an Inflammation threatened and neer at hand; in regard that it may (by reason of its heat and thinness) be a vehicle or means to convey the humors unto the part affected. And therefore *Hippocrates* (in his Book of Ulcers, text 1.) writeth in this manner. *A small and moderate quantity of Meat, and the drinking of water, is mostly fit and requisite in all Wounds whatsoever; but yet rather in those that are new and fresh then in those that are old and of a long standing; and then especially when in the wound there is present an Inflammation, or if there shal be any feared; or when there is any danger lest that any thing may be vitiated; or when the wounds of a joynt are attempted by an inflammation; or when there is any fear of a convulsion at hand; and lastly, when the Belly hath received a Wound.* And therefore for those that have been long accustomed to drink water, (and where there is no great plenty of beer) either simple and pure water may be administred unto the patient; or else a Medicate water, destilled out of the *juice* of *Pomgranates, Coriander seed, Citron rinds,* or *Barley water*, or the water destilled out of the whol Citron. When the danger of the inflammation is past, then that wine that is thin and weak may be allowed the patient now and then. In wounds that are more grievous and ful of danger, Medicate drinks may be provided and made of vulnerary herbs.

As

Motion, and rest, which of them fittest for those that are wounded.

As for what Concerns the motion and rest of the body; Rest is most convenient for wounded persons; but more especially for the wounded part. For motion moveth and scattereth the humors, and rendereth them apt to flow; and the moving of the wounded Member exciteth a pain in it: and yet nevertheless, for the Patient to walk easily and gently (his leggs being sound, & unhurt) it wil be no way amiss, but very good for him so to do: touching which *Celsus* (in his fifth Book. and *Chapt.* 26.) thus gives us his opinion. *The best Medicament likewise (saith he) is Rest and quietness: and to Move and walk (unless for those that are sound, and in health) is not so fit and convenient: but yet nevertheless, it is least dangerous in those that are wounded in their head, or Arms; but more unto such as are wounded in their inferior parts. But motion or walking is then least of all convenient, when the wound is either in the Thigh, or the Leg, or the Foot.*

Affects of the mind how they are to be ordered

The Commotions likewise, and all perturbations of the mind are carefully to be avoyded; and more especially, wrath and Anger. And therefore those persons that may be an occasion of incensing and provoking to anger the sick person, are not to be permitted to come where he is; nor so much as any mention to be made of them in his hearing. But the Patient ought rather to be moved and stirred up unto a moderate and fitting mirth and cherefulness, and all possible tranquillity and calmness of Mind. And of all other things that are prejudicial unto the Patient at this time, the use of *Venus* and the company of women is the most hurtful. Immoderate and overlong watchings are also very offensive; in regard that they inflame, and cause a commotion in the humors. The sick persons belly must be kept open and soluble; and if it chance at any time to be stopt and shut up, it is then again to be opened and loosened with mild and gentle Clysters.

Chap. 13. *Of keeping the flux of humors from the Wounded part.*

And thus much touching the general cure of Wounds; which yet notwithstanding is sometimes to be varyed according to the variety of the subjects, the Nature of the wounded part, and the condition of the diseases, and the symptoms that flow thereupon; and of this we shall now speak.

And first of all indeed, it oftentimes happeneth, that the body that is wounded may not be exactly and perfectly sound; but that it may be either Plethorical or cacochymical; so that there may be great cause to fear, lest that either great abundance of blood or the vitious humors that have been long treasuring up in the body may by occasion of the wound rush unto the affected part, and there excite various evils. And therefore we are to use our utmost endeavour to hinder and prevent the afflux of the humors unto the wounded part. Now this flux is especially prevented, if care be taken to hinder all those causes that may excite the said flux: and moreover al those things that may overmuch and preternaturally heat the wounded part, excite a pain therein, or render the same soft, loose (and so consequently the more apt to receive the flux) or overheat the humors, disperse them, and so render them the more fit for motion, are wholly to be removed, and taken quite away And such a care and orderly course there ought also to be taken in point of dyet, that it may not in any wise generate either too great abundance of blood, or bad and corrupt humors.

And furthermore, we are likewise to succour and help the weak and infirm part by those things that corroborate and strengthen it; the pain (if there shall be any) is to be mitigated; if there be present any heat, it is to be altered; and at length the overgreat abundance of the blood is to be lessened, and the vitious humors to be evacuated: and this may fitly be done either by vene-section, or else by purgation.

Venesection, or blood letting

And therefore, if blood abound in the body, so that there be cause to fear the afflux there of unto the wound; it is in this case (unless it hath already before much flown forth) very fit to open a vein, and let forth a due quantity thereof; Touching which *Celsus* (in his fifth Book. and 16. *Chap.*) saith thus; *The Physitian ought to take forth some of the blood, thereby to cause a dryness*; And presently he adds; *let the blood therefore flow forth more abundantly, that so there may be the more abundant dryness: but if it flow not forth sufficiently, let the vein be opened as much as may be; if it be so that the patient hath strength enough to bear this loss of blood.* And this is chiefly to be done in great wounds, in which there is cause to fear an Afflux of the blood, by reason of the pain of the Wounded part; and here in this case blood is likewise to be drawn forth, albeit that it doth not overgreatly abound in the body: whereupon *Hippocrates* (in his Book of the Joynts) in the bruising and wounding of a Rib, prescribeth

beth the taking forth of blood out of the Arm; where *Galen* in his *Comment* upon the place, addeth; *Although (saith he) there be no extraordinary store of blood abounding in the body, yet in those kind of blows and bruises we must have recourse unto vene section, and letting out a due quantity of blood.* And in his second Book of the *composition of Medicaments according to the places*) he commendeth (in the first and chiefest place) venesection, for all pains of the head proceeding from a blow.

But now that this venesection may perform the whol work, and that it may cause not only evacuation, but likewise revulsion; the vein is therefore to be opened a good distance from the part affected, and on the contrary side, as elsewhere we have told you, touching revulsion. Now this is to be done with al speed possibly, even the very first day of the wound and indeed before there be any medicament administred, that so the afflux of the blood unto the wounded part may be prevented.

As for the quantity of the blood to be let forth, it ought to be according to the store that is in the body; and according likewise to the strength of the Patient, and his ability to bear it. And therefore if there flowed forth much blood before, then venesection is to be omitted. But if there flowed forth little or no blood before, then you may now let forth a due proportion thereof; but alwaies according to the strength of the Patient and no otherwise: which you may best of al know by the Age of the wounded person, the habit of his body, the time of the yeer, and other Circumstances; touching which we have already spoken in its proper place.

Purging.

But now, if vitious humors abound in the body then there wil be need of purging. For it being so that the Wound is so much the more successfully and more speedily cured, by how much the more sound the part is, and of a good constitution; and that the ill constitution of the wounded part doth much hinder the cure: we are therefore by all means possible to do our indeavor, that so the vitious humors may not flow unto the part affected.

And thereupon seeing that by occasion of the Wound it may very easily come to pass that they may flow unto the part affected: if they be found in the body, they are forthwith to be evacuated. And this is to be done in great wounds and where we have cause to fear lest that by reason of pain the depraved humors should rush unto the wounded part; as also in those wounds where there is any kind of cutting or dilating to be used, and where any bones is to be made bare of its flesh; and in a word, in al wounds whatsoever wherein the pain is more vehement then ordinary. But smal Wounds, and such likewise as are free from pain may be cured even without any purging: but yet notwithstanding if the belly be bound, it is then to be opened and loosened with a Clyster.

Whether those that are wounded may be purged.

There are some indeed that are utterly against purgations in any wounds whatsoever, as fearing lest that the humors being much stirred and disturbed by the sayd purgations should flow so much the more unto the wounded part. But *Hippocrates* admitteth of them; as we may see in his fourth Book of *affections*, touching *Fractures*, *Text* 48. *Comment.* 3. and *Galen in the fourth Book of his Method of curing*, *Chapt.* 4. *and* 6. And indeed reason it self perswadeth hereunto. For if hot, thin, and cholerick humors abound in the body, they render the blood very apt for motion; and then by means of pain and want of rest they easily become hot and are inflamed, and so afford an occasion for a feaver.

But now, albeit that all the vitious humors abounding in the body, are to be evacuated; yet notwithstanding, (as we have sayd) more especially the hot, Cholerick, and wheyish humors are to be evacuated; which are more apt for motion and flowing; and such as make much for the generating of inflammations and Erysipelases, and such as do very easily excite feavers. Even at the very first beginning a purgation is to be appointed, to wit, before ever there be any afflux excited, and that any feaver shall happen. But if there hath already happened any feaver, purgation cannot then so conveniently and safly (but indeed with some kind of danger) be instituted and appointed.

And therefore to purge (in Wounds) there are most fitly and safely to be administred, *Manna, Syrup of Roses Solutive, Rheubarb, the Leaves of Sene*: and of compositions, *Tryphera Persica Elect de Psyllio, Elect. of Roses of Mesues*. But we must abstain from the hottest purging medicaments; lest that there should thereby be excited an afflux of humors, that might dispose the wounded part unto an inflammation. But in what manner the purgation is rightly to be ordered, we have elsewhere already shewn you.

CHAP.

Chap. 14. *Of the Wounds of the Veins and Arteries; and of the ſtopping the Hæmorrhage in Wounds.*

AS touching the wounded parts themſelves, oftentimes by reaſon of them there is ſomething that is peculiar to be done in the Curing of wounds. How and after what manner the Cure of the wounds of private parts is to be rightly ordered, we have already told you in thoſe places which we ſhall afterward alleadg. In the general, the wounds of the Veins, Arteries, Nerves and Nervous parts, do require a peculiar and proper kind of Cure.

The Hæmorrhage in Wounds:

And Firſt of all, indeed, the Wounds of the Veins and the greater Arteries have this peculiar unto themſelves, to wit, that there is alwaies ſome notable Hæmorrhage to accompany them; which oftentimes cauſeth Faintings and Swoundings, and other dangerous Symptoms. But now the Blood floweth either out of the Veins, or out of the Arteries; and of theſe, ſomtimes indeed out of the greater, and ſometimes out of the leſſer; and either out of one alone, or elſe out of many. And although that the wound inflicted upon the Veſſel be the prime and principal Cauſe of the Hæmorrhage; yet it happeneth (and that very often alſo) that the blood may indeed now and then be ſtopt for a while, and yet it may afterwards ſuddenly break forth again; and this more eſpecially chanceth upon the Commotion of the minde and provocation to anger. And ſo likewiſe the preſence of the Patients Adverſary, that gave him the wound, maketh greatly for the cauſing of a new and freſh Hæmorrhage in the Wound: for which very Cauſe it is ſomtimes found by experience, that the Blood that was before ſtanched and ſtopt, begins again to flow forth afreſh. And I my ſelf remember, that one Brother having wounded another, and while the Wound was binding up the Brother that gave the Wound coming in to viſit the other, (albeit that they were now reconciled) the Blood ſuddenly brake forth afreſh; and this without doubt from the ſecret commotion of the minde; for upon his departure, and being forbidden to give any more viſits, the Blood again ſtanched.

Signs Diagnoſtick.

But now, ſeeing that the Blood floweth either out of the Veins, or elſe out of the Arteries; that which floweth forth of the Veins is more thick, more black and dark, and leſs hot; and it floweth forth without any great violence and ruſhing, and with an equal pulſe, and doth far leſs deject the ſpirits, (all things elſe being anſwerable) then that which cometh forth of the Arteries. But now that that cometh out of the Arteries may rather be ſaid to leap forth with violence, then to flow; and in the pouring out it is more hot and fervent, more thin, more yellow, and more frothy; and it is evermore accompanied with ſome notable change and alteration in the Pulſe, together with a weakneſs and dejection of the Patients ſtrength. If it be one of the greater Veſſels that is opened, then the Blood floweth forth in the greater abundance, and with ſo much the greater violence; but with far leſs, if it be one of the leſs Veſſels that is opened, and wounded. But now, what Vein or Artery it is that is wounded, and whether only one or more of them be wounded, this muſt be known from thoſe that are expert in Anatomy.

Prognoſticks.

1. An overgreat Hæmorrhage in Wounds is very dangerous: for the Blood is the Treaſure of the Life; and when the vital ſpirits are called forth, it cauſeth a weakneſs of the Pulſe, (it being ſo ſmal that it can hardly be diſcerned) as alſo a frequency and inequality thereof, and ſomtimes an intermiſſion therein, a fainting and ſwounding, a *Syncope*, an extream Coldneſs and Chilneſs of the outward parts, and inordinate ſweats, a Convulſion, ſighings and ſobbings, Deliries, and at length death it ſelf. And hence it is that *Hippocrates* (in the 5. *Sect. of his Aphoriſm. Aphor.* 3.) ſaith, *that a Convulſion or Sighing happening upon an abundant flux of the Blood is alwaies very evil and dangerous.* And in the 7. *Sect. Aphoriſm.* 9. *that a Deliry, or a Convulſion alſo happening from the abundant flowing forth of the Blood is evil and ful of danger.* And indeed it is ſo much the more dangerous, if a Convulſion be joyned with a Deliry, and that the Deliry happen not alone without the Convulſion.

2. And this is more eſpecially cauſed by the effuſion of the Arterial Blood, in regard that with it there is very much of the heat flowing in, as alſo the vital Spirits that are moſt chiefly Neceſſary for the preſervation of the life, poured forth and diſſipated.

3. And moreover alſo, for this reaſon the Wounds of the Arteries are more dangerous then the Wounds of the Veins, becauſe that they are more difficultly Cured and Conſolidated, by reaſon of their hardneſs, their perpetual motion, and the violent ruſhing forth of the Arterial Blood.

4. And

4. And those Wounds of the Arteries are yet likewise far more dangerous (and bring along with them a greater Hæmorrhage, and such as is more difficult to Cure) that are inflicted according to the length of the Artery, or transversly, or obliquely, then those in which the whole Artery is cut assunder, as experience it self testifyeth; so that indeed, (and as the Physitians are wont to perswade) if the Hæmorrhage cannot otherwise be stopt and stanched, in regard that the whole Artery is not cut quite through, it is then wholly to be cut assunder in a transverse manner. For if that the Artery be thus transversly cut in twain, it will again be contracted, and its orifices will again close and shut; and thereupon they wil the more easily meet and grow together again, and the sooner be covered and shut up by the circumjacent flesh lying round about it; neither will the Wound so gape and stand so wide, while the Artery is dilated. But if that the Artery be Cut long waies, or obliquely, (or if it be wholly cut assunder any otherwise then transversly) since that it is moved with the continual motion of the Dilatation and Contraction, by this motion, and especially the distention, the Wound is more dilated, and in every Diastole it gapeth; whereupon the Blood is poured, and leapeth forth with violence and rushing.

The Cure.

As in every over great Hæmorrhage, so likewise in this that proceedeth from a wound, we meet with a twofold Indication; the one, that which the wounded Vessels themselves suggest unto us, which requireth a Union and Glutination. The other that which the Hæmorrhage suggesteth; which if it be excessive and overgreat (so that it dejecteth the strength and powers of the Body) requireth that it be stanched, even before ever that the Vessels be shut up, and united. For whereas unto the Union of the Vessels there is some space of times required (so that the Patient may in the mean while run a great hazard of his Life) the Blood is therefore immediately to be stanched.

That the Flux of the Blood therefore may be stopt (although that the Wound of the Vessel be not as yet grown close together) all those things are to be performed which may hinder and inhibite the motion thereof. Now the Flux of Blood it impeded, if with convenient Remedies, and the binding up, the orifice of the wound be closed and shut up. In which manner if the Blood cannot be restrained, and that it also break through the Wound closed and shut up in any manner whatsoever, and all by reason of the impetuous violence of the Blood, then all those things that do any waies help forward the violent motion of the Blood are to be removed, such as are, the overgreat abundance of the Blood stirring up and continually provoking the expulsive faculty; Anger, drinking of Wine, hot and thin Humors (as it were) continually boyling up, and over violent motions of the Body: as likewise of an Artery, if it be not wholly cut in sunder, the motion thereof, the declining and downward Scituation of the member, and the like; and hitherto also may be referred the pain and heat in the part, which attracteth the Blood; and in this case that that violently and impetuously rusheth unto the wounded part is to be turned another way.

And first of all therefore, that the orifice of the Wound may be closed and shut up, we ought to use the utmost of our endeavour that this may be done. Now this is to be effected two waies; either by the Joyning together of the Lips of the wounded Vessels; or by the stopping of the orifice of the Wound. The Lips of the Wound may be joyned together, either by pressing together with the Fingers the orifice of the Wound, so long until the Blood be clotted, so that the thick and clotted Blood may it self obstruct and stop the orifice of the Vessel, that so the Mouth and Lips of the Vessel may touch and close together; or else the orifices are to be drawn close together by Swathes. But now, it is very rare that we may keep our Finger upon the orifice of the Wound until the Blood be clotted, so as to stop and obstruct the said orifice: neither hath this any place in the wounded Arteries, since that the Arterial blood, by reason of its thinness and heat, and the motion of the Artery, doth not easily (if at al) Clod in the orifice of the wound. Neither also may the Veins (if they lie deep) be easily drawn and kept close together by Swathes, neither yet may their orifices be pressed together with the Fingers. And therefore the safest Course is, that we do the best we can that so the orifice of the Vessel pouring forth blood may be stopt. And this that it may be done artificially, let the orifice of the Wound be shut up and closed with the Finger, as much as possibly it may be done; but if it be so that the orifice it self of the Vessel cannot be reached unto by the Fingers, then that branch of the Vein that poureth forth the Blood there in that place whereby it tendeth to the Wound, is first of all (in the place neerest unto the Wound) to be pressed very hard together with the finger; and the Wound to be cleansed from al humidity; and then after this there is immediatly a Medicament that will stop and stanch the Blood to be imposed. Which that it may be

be rightly and duly performed, the wound is not only to be loaden and rashly oppressed (a thing wherein I have seen many Chirurgeons greatly to offend) with too many astringent Medicaments; but we ought to use the best of our endeavor, that the very orifice of the wound be instantly (and that very close and strictly) shut up. For unless this be done, albeit there be never so many of these kind of Medicaments imposed; yet nevertheless if the orifice of the vessel be not close shut up, and obstructed, the blood wil by it break forth, and so make void all the labor and pains the Chirurgeons have been at, and all the former provision (be it never so great) that they have made. Now for the stopping and stanching of the blood in this manner, there is hardly any thing to be named that wil more conveniently do it (as daily experience testifieth,) then that kind of Mushrom dryed (they commonly call it, *Crepitus Lupi*, or Woolfs fart) that usually groweth, and is to be found up and down in Vineyards. For it being of a nature most dry, as it will no way admit of the flowing forth of the blood (which those Medicaments do that are naturally moyst, and therefore they are but little or nothing useful for the stanching of the blood) so it will ikewise cause that it subsist and stick fast in the vessel. But now this is most especially useful and beneficial, if it be first with a thread tyed together, and a weight layed thereon, or else pressed down and kept close together with a press wrung down hard upon it. For so, when it comes afterward to be imposed upon the wound, it again dilateth it self, and so stoppeth up the orifice of the wound.

What Medicaments they are that stanch the Blood.

But if it be so that you are not minded to confide in this one only remedy, then those powders that are known to be Astringent ought first to be strewed and sprinkled upon the wound. *Galen* above all other Medicaments (for the stanching of the blood) commendeth this that followeth: and in the fifth book of his Method, and *Chapt.* 4. he writeth that it is absolutly the best of all that he knew, and that he should much wonder, if it should be any ones chance to find out a better. It is as followeth;

Take *Frankincense one part, Aloes one part and a half, Make a powder, and of this powder mingle a sufficient quantity with the white of an Egge, to the consistence of hony. Make up this mixture in those soft hayrs (or flix) of a hare; and so lay it upon the vessel, and the whol wound. And afterwards in a fit and convenient manner bind up the wound with a swath; and then at length open and unbind it again on the third day. While this Medicament yet sticketh unto the wound, put yet another upon it; but if the former liniment begin of its own accord to fall off; then with the finger gently pressing down the root of the vessel (to wit) that nothing may flow forth of it, take away that with a careful hand, and put on the other. For so long as the Medicament shall be softened by the blood, the fluxion cannot be said to be wel and sufficiently stopt.* See Galen *in the place before alleadged. There are nevertheless other pouders that are likewise very useful* As.

Take *Bolearmenick, Dragons blood, Frankincense, Aloes Succotrine, of each alike, equal parts, and make a powder.*

Guilhelm. Fabricius commendeth this following, as having often made use of it with very good success.

Take *of the finest wheaten meal three ounces; Dragons blood and Frankincense, of each half an ounce; Oriental Bole, and sealed earth of each two drams; Parget six drams; water frogs prepared one ounce; Moss of a mans skul half an ounce; the soft flix of the hare cut very smal, one dram; the powder of the whites of Eggs carefully dryed in the Sun; the froth of the Sea dried likewise in the Sun, a new sponge tosted and torrefyed at the fire, of each half an ounce; Mingle them, and make a very smal and fine powder.* or,

Take *Moss of the wild sloe tree, the root of the nettle, and of the herb Dragon, of each half an ounce; Make a powder, and strew it upon the wound,* or,

Take *Vitriol powdered, as much as wil suffice; put it into a little linen cloth, and lay it upon the wound.* or,

Take *Aloes, Frankincense, the finest wheat flower, Spiders cobwebs, Bolearmenick, the soft flix of a hare, of each one dram, make a powder.* Or,

Take *A dead Nettle, and having beaten it into a very fine powder strew it upon the wound.*

Neither are we to desist from the use of those Medicaments, until the flesh that is bred is so produced about the vessel, that it shut up the orifice thereof. For unless this be done, there wil yet be alwaies great cause to fear an hæmorrhage.

Magatus his water against the hemorrhage.

Cæsar Magatus (in his first Book and 61. *Chapt*) writeth that this water following, (being wel mingled together with the whites of Eggs throughly beaten) doth perform wonderful effects.

Take *Juice of Plantane, of the sour unripe Grape, of Quinces, of sharp and tart Pomgranates, vinegar made of black wine, of each one pound; the Juice that is newly pressed forth of*

Asses dung one pound; the whites of thirty Eggs wel beaten together. The herb Horstail, Strawberry leaves, Mousear, Adders tongue, the herb Trinity, winter green, the herb Perewinkle, Wild Tansey, Bears ear, the leaves of al these new and fresh gathered, one handful; the new and fresh Roots of the greater consound one pound; the greater Centaury half a pound; Pomgranate Rinds and flowers, unripe Galls of the Oak, Gum Arabick, Tragacanth, Sarcocol, White Frankincense, of each half an ounce: Roots of Tormentil, Bistort, Bolearmenick, Sealed earth, Dragons blood, Earth of Samus, of each of these three drams; bruise what is to be bruised, and powder those things that are to be powdered, and so mingle them: and after a three days maceration, in a double vessel let there be a water drawn forth according to Art. But I doubt much whether or no this destilled water wil have in it any considerable Astringent virtue; in regard that that part of simple Medicaments in which the astringent power doth chiefly lie can hardly ascend thorow the Alembick.

More efficacious is that water that is destilled from Alum, after the manner following.

The Alum water.

Take *of the best Alume as much as you please; powder it and put it into a Buls or Oxe bladder and so put it into a kettle of hot water, that the Alume may be dissolved. Destil this water by an Alembick; and continue the work so long, even until the feces reside in the bottom. And these are again a new to be dssolved in the Oxe bladder, until the whol substance of the Alume shal by destillation be converted into water.*

Whether in case of an Hemorrhage we may use Caustick.

But if the blood shal not be stanched by these Remedies; there are some that use Causticks, that bring a crustines over the Wound, and so by the benefit of it shut the Orifice of the vessel. But the truth is, this way is not safe enough, but ful of peril. For seeing that so much of the Particle as is burnt into a crust, so much there falleth away of the Natural flesh from the part; when the crust falleth off the orifice of the vessel is again left naked, and bare of flesh; so that there is oftentimes a new hæmorrhage excited, and not easily stanched. Of these we may most safely make use of such of them as being burnt retain stil a caustick virtue, and being not burnt have in them a notable astringent power, but very little of the Caustick faculty, whereby they burn: and such a like medicament is crude *vitriol*; which therefore some (crude as it is) do beat into a powder, and so sprinkle it upon Wounds, for the stopping of the hæmorrhage. But others there are that dissolve it in water, and then they moysten linen clothes, & lay them upon the wound. And moreover *Calcanth* (which some call shoomakers black) either pulverized, or else dissolved in a convenient liquor is of singular use in wounds, where the orifice of the vessel cannot be closed either by compression, or by that mushrom before mentioned (which they commonly call *Crepitus Lupi*) or even by burning, be there never so great need thereof. But this Calcanth (especially if dissolved in liquor) penetrateth even thorow the very vessel that is hurt. But here notwithstanding we are to beware that the nerves (if any be neer) be not hurt. And therefore into such like deep Wounds (if there be any Nerves in the wounded part) other Medicaments that have a power to stanch blood are rather to be cast in by clysters that have little ears affixed to them, or some other fit and convenient instruments.

The virtue of vitriol in an Hæmorrhage.

In the interim notwithstanding, it will be likewise very requisite to administer certain general or (as they cal them) universal, remedies that make for the stopping and stanching of the blood, to wit, drawers back, intercepters; and certain internal Medicaments that stay the blood.

Venesection.

Those things that draw back, are first, venesection, appointed in the contrary place; which may then only be put in practise when the hemorrhage is not great, and the strength of the Patient but little impayred. But yet nevertheless, that so the Patients strength may be the better preserved, and the revulsion performed with the more expedition, the blood is not at once to be evacuated, but at several times.

But if the Patients str ength wil not bear venesection in this case, Cupping-glasses both dry, and scarifyed (as need shal require) are to be applyed in the remote and opposite places.

Intercepters.

But now Intercepters are administred, to the end they may drive back and incrassate the blood while it is in flowing unto the part; & that they may make more narrow those waies and passages by the which it floweth. But now such intercepting Medicaments are to be applyed unto the vessels by which the blood tendeth unto the wounded part; and so above upon the part, toward the root of the vessel; and more especially (where it possibly

bly may be done) in the exterior parts where only the veins lie hid under the skin, and are not covered with much flesh: touching which *Hippocrates* (in his fifth *Section, Aphoris.* 23) giveth us this advice. *We ought* (*saith he*) *to make use of some cold medicament, in those persons that have at present any blood flowing from them, or that are likely to be troubled therewith; and this medicament is not indeed to be applyed unto the same place, but unto those places from whence it floweth. & if there be any inflammations or burnings of the parts that tend unto a red or bloody colour* (*by reason of the fresh and flourishing blood that now appeareth therein*) *unto these very parts let it be administred.* Now these intercepters are made of Medicaments that are cold and Astringent, as *Posca* (*a compound of vinegar and water*) *harsh wine, the water of Roses of Plantane, of the Oak, and of night shade; Barly meal, the powder of Myrtles, Bolearmenick, Dragons blood, Mastick; the flowers of red Roses, Pomgranate flowers, and the whites of Eggs,* of which there are divers Medicaments to be made: the forms whereof are above propounded and set down (in the first part, *Chap.* 5.) among the defensives, in an inflammation. The Medicament being layd on, the part is to be bound up with a swath, that may bind close the vein toward the root thereof; and the ligature is not to be loosned before the third or fourth day; or indeed, it is not to be untyed until the blood be throughly stanched. *Avicen* (*in his Quart. Quarti, tr.* 2. *Chapt.* 18.) tells us of this following medicament, that hath in it not only a power of burning, but likewise an astringent faculty; and a virtue also to generate and breed flesh: As,

Take *Chalcanthum, Parget made into a very fine powder, and sifted thorow a hayr sieve, of each twenty drams; Frankincense powdered six drams; Aloes, dry Glue, of each eight drams; Arsenick four drams;* (*I had rather here take Mercury sublimate, in regard that many who are ignorant of things Chymical and Metallick, of tentimes when sublimate in general is mentioned,* (*and Mercury sublimate is evermore to be understood*) *there instead thereof these do substitute and appoint Arsenick:*) *let them be al beaten into a very fine and smal powder, made up in a liniment, and imposed upon the orifice of the vessel. Some there are that unto this Medicament do add Dragons blood, and the excrescence Hypocistis.*

But those internal medicaments that stanch blood, are either such as cool and thicken the blood, or else they are those we cal Narcoticks. The coolers and thickners are prepared of *Myrtle, Roses, Purslane, Lettice. Berberries, Ribes, Succory, Quinces, Pomgranates, Tormentil, Corals, Bolearmenick, Sealed Earth.* Out of which may be made Powders, Waters, Syrups, (and from these potions) and Electuaries.

There are likewise some certain things that are sayd to stay the blood by an occult and secret property: and thus *Strawberry Water* is much Commended in al hæmorrhages. And the *Root of Corn-rose* (or Cockle) held under the tongue stoppeth the hemorrhage. And some there be that for this purpose commend unto us the roots of that Cichory that hath a white flower. And some there are that order the Patient to hold in his hand the *Jasper Stone*, or the *Blood Stone.*

Stupefactives are not over commonly to be administred; neither indeed at all, unless the strength remain firm and entire; for fear lest that the powers being already much weakned, and faylng by reason of the over great loss of blood, should by these stupefactives be farther dejected: but if the Patients strength wil admit of it, then we may administer one grain (or two at the most) of *Opiat Laudanum.* But now that the blood when it is stanched may so remain, for this the situation of the wounded part maketh very much; which ought to be such, that the Member may look upward, and be free from all pain. For pain doth very easily attract the blood, and cause it to break forth again; and the blood doth more easily flow unto a declining and downward place.

If yet the blood by this means be not stanched; they tell us that we are then to cast upon the vessel pouring forth the blood somthing to tye it withal; and especially toward the root thereof, by which the branch looks toward the Liver, or the Heart; and that the veins or Arteryes are to be made naked and bare, to be layd hold on with a hook, and then presently with a thread (of silk especially) to be tyed, and the thread to be drawn very hard and close upon them; and then they appoint that the wound be filled up with flesh, before the bond be quite taken off. For if the flesh shal not first of al have filled up the place that is about the vessel, and have shut the very orifice of the vessel it self, the bond falling off, the hæmorrhage wil again easily follow. But the truth is that these things are more easily required and commanded, then they are put in practice & performed. If a vein or an Artery wounded & pouring forth blood be wholly cut asunder, the blood is then the more easily stanched: for the vessel is drawn back, and on both sides contracted within it self; and so its orifice is covered and shut up by the bodies that lie round about it.

But the best, safest, and most easie way (if it be rightly ordered) of stanching the blood, is that which is wrought by Medicaments that stop and stay the Blood, and shut up the orifice thereof; as they were before propounded by us.

When the Blood shal be stopt, the Wound is scarcely to be opened before the third day. And if the Wound be unbound, yet notwithstanding if there be yet any further fear of the Bloods breaking forth again, the Medicament is not wholly to be taken away; if it be not as yet moystened and vitiated by the purulent and sanious matter. But if by these it be made so moist, that it is ready of it self to drop off, another is in this case to be laid on, if there be yet any further flux of blood feared. And yet notwithstanding we are herein to deal very Cautiously, and with all manner of Circumspection; and with the one hand that part of the Vessel toward the Root thereof is to be pressed down close together, that so the flux of blood may be restrained; and with the other hand the Medicament is to be taken off, the moist Wound to be clean. and dried, and a new Medicament laid on.

But now if the internal Vessels shall be so wounded that they can neither be tied together by any ligature; neither yet obstructed and shut up by any Medicaments laid thereon; then Medicaments out of those things that have in them a virtue to cool and thicken the Blood (and which were but even now mentioned by us) are to be provided; and a Dyet that is like and answerable thereunto (as we have said) is to be prescribed.

Now when the blood shal be fully stanched, and shall become clotted, then we must use the best of our endeavour to prevent the putrefying of it; but that it be rather dissolved: which in what manner it is to be performed, we have declared before, (in the 2. *Book*, *Part* 2. *Chap.* 6. and above in the *first Part*, and 16. *Chap.*) where what we have written may be seen at large: for in this Chapter it is our purpose only to treat of the stanching of the Hæmorrhages of Wounds.

The Dyet.

The Dyet is likewise so to be ordained, that it may stop and stanch the Blood; and to this end, Meats are to be provided, *of Rice, of Amylum or the fine flour of Wheat, Barley, Pears, Ribes, Quinces, Services, Medlars, Lettice, Endive.* The Patient ought to abstain from Wine. He must likewise keep himself from Rage and Anger, all Commotion of the Minde, and over vehement motion and Exercise of the Body; and therefore his Adversary that gave him the Wound is not to be admitted into the Room where the Patient is.

Chap. 15. *Of the Wounds of the Nerves, and Tendons, in general, and of the pricking of the Nerves.*

And moreover, the Wounds likewise of the Nerves, Tendons, and Ligaments, are for the most part of such a Nature that something in the Curing of them may fal out that is peculiar and proper to them alone. And first of all, as for what concerns the Nerves, as also the Tendons, (for what we shall speak touching the Nerves may likewise be applied unto the Tendons) they are of another Nature then the flesh; and therefore also (as we shall afterward shew you) they require other Medicaments then the wounded fleth doth; and furthermore they have a very quick and exquisite sense, as the Tendons likewise have; and thereupon if they be hurt they bring great Pains and Convulsions. Now the Wounds of the Nerves are twofold; to wit, Pricking and Incision; according as the wounding Instrument inflicteth the Wound, either by a Prick or a downright Cut.

Signs Diagnostick:

Now the Wound of the Nerve is known first of all, from the Consideration of the wounded place; and from Anatomy, which acquaints us with the Nerves that are in every Member, and how they enter and are Scituate in them. For which cause, it is likewise to be considered, whether the wound be in the Heads of the Muscles, or in the ends of them: and whether the wound be above upon the Joynts, or else in the very Joynts themselves: for if it be in the Heads of the Muscles, it betokeneth that a Nerve is wounded; but if it be in the ends, and neer the Joynts, it is a sign then that a Tendon is wounded. And moreover, from the vehement pain that immediatly after the receiving of the wound infesteth the wounded person, unless the whole Nerve be cut assunder transverswise or over thwart. For the Nerves have a very quick and exquisite sense; and therefore, when these are prickt, there instantly ariseth in the wounded part a vehement pain, and upon this an inflammation; and so the Brain being drawn into a Consent, oftentimes Convulsions and Deliries are excited. But now the Tendons, although they are not endued with a sense altogether so quick and exquisite; yet never-

nevertheleſs, even theſe (they being not wholly void of ſenſe and feeling) when they are pricked, there are alſo pains, and from thence Convulſions excited.

Prognoſticks.

1. All Wounds in the Nerves are dangerous, by reaſon of that exquiſite ſenſe they have, and their Conſent with the Brain. And yet notwithſtanding, a Wound by pricking is more dangerous then that that is made by cutting, as afterwards we ſhall ſhew you.

2. The Wounds of the Tendons are leſs dangerous then thoſe of the Nerves.

3. *That Convulſion that happeneth upon a Wound is Mortal*, as we find it, in the 5. *Sect. Aphor.* 2. Which is to be underſtood of the Wounds of the Nervous parts. And yet notwithſtanding, the Greek word *Thanaſimon*, and the Latine, *Lethale*, (as *Galen* explaineth it in his *Comment*) do not here ſignifie that which of neceſſity and evermore bringeth Death, but only that which is very dangerous and oftentimes cauſeth death.

4. *Thoſe that with their Wounds (as ſuppoſe, thoſe of the Nerves) have conſpicuous Tumors, theſe are not greatly troubled with Convulſions, neither with madneſs; but thoſe in whom the ſaid Tumors ſuddenly vaniſh (if this be done in the binder part) unto ſuch Convulſions and the* Tetanus *do uſually happen: but if it be on the forepart that theſe Tumors vaniſh, then there wil befal them madneſs; a ſharp pain in the ſide, an* Empyema *and Dyſentery, if the Tumors be of a Reddiſh colour.* Sect. 5. Aph. 65.

5. Yea, what we find in the 5. *Sect. Aphor.* 66. (and which we have above alleadged touching wounds in general) hath place here more eſpecially; to wit, *if the Wounds being great and dangerous there ſhall no Tumor be ſeen to appear, it is then a very ill ſign.* For in no kind of wounds are Inflammations more eaſily excited, then in the wounds of the Nerves. And therefore, if there be preſent any Cauſe and occaſion of a fluxion; and yet nevertheleſs a Tumor ſhall not happen thereupon; it is then a ſign that either the matter is driven to ſome other place, by repelling Medicaments, and ſo deteined in the more inward and deep places and parts of the Body, or elſe that they are by Nature her ſelf thruſt unto ſome other place.

6. And yet notwithſtanding there oftentimes appear no Tumors at all in ſuch kind of Wounds; to wit, if the Phyſitian take away all the Cauſes of fluxion, or if that Nature her ſelf ſhall allay and aſſwage the violence of the Humor. And there is alwaies ground of good Hopes, if even unto the ſeventh day there ſhall follow no evil thereupon: for it is a ſign, that Nature hath appeaſed the motion, and the impetuous violence of the Humors: touching which, *Galen* (in his *third B. of the Compoſit. of Medicam. according to their ſeveral kinds*, and 2. *Chap.*) thus writeth: *If unto the fifth, or even unto the ſeventh day of the Diſeaſe, there be neither Phlegmone ſo much as appearing, and that there be altogether a freedom from pain, and that the ſick perſon feel no extenſion and ſtretching in the part affected, he ſhall after this time be ſafe and ſecure.*

7. The wounded Nerves do very eaſily likewiſe conceive a putridneſs; ſince that they have in them but a weak heat, and are of a very dry Nature, and ſo may be eaſily hurt by thoſe things that are moiſt; whereupon it is that Water and Oyl are enemies unto the Nerves. Neither is that putridneſs and Corruption conteined in the wounded part alone, but it is likewiſe communicated unto the neer neighbouring parts, yea and oftentimes alſo unto thoſe parts that are more remote. Whereupon it is, that the hand being wounded, or but the Finger only, the pains are wont to appear in the Arm and Shoulder; and that the Leg being hurt, there are wont to be in the Thigh not only pains, but alſo Impoſtumations; and that the Malady is imparted not unto one of the ſides alone, but even unto that alſo that is oppoſite. Yea and in the whole Body likewiſe the Humors are corrupted; whereupon feavers, pains in the ſides, and Dyſenteries are wont to be excited. And (that which we are here to give you notice of, and not to paſs it over in ſilence) there are not evermore preſent ſigns that betoken an Inflammation or putridneſs; yea and oftentimes there are likewiſe preſent no vehement pains; but that very often ſecretly and ſuddenly the Convulſion invadeth the wounded perſons. For the vitious matter being thin and depraved is hiddenly carried by the Nerves unto the Brain, (as we ſee that this is done in the Epilepſie or Falling-ſickneſs) a poyſonous Air aſcending unto the brain from the extream parts, without any notable pain in thoſe parts by and through which it paſſeth. Of which thing we meet with many examples, and how that the wounded perſons, without any pain and Inflammation, have been ſuddenly ſurpriſed with a Convulſion, and have inſtantly died thereupon. And therefore in the Wounds of the Nerves, although that there ſhall be no pain felt, neither any Inflammation appearing; yet notwithſtanding, we are not to truſt to this; but for all this the Cure is carefully to be heeded and attended.

The Cure.

Touching the Curing of the Wounded Nerves, *Galen* (in his sixth Book of his Method of healing, *Chap.* 2.) taketh a great deal of pains in treating thereof. But seeing that in all Wounds of the Nerves pains and inflammations easily make their approach, and threaten the patient, we must endeavor that the pain may be mitigated, and the inflammation prevented. And therefore if need require, both by letting forth of the blood, as also by a purging out of the sharp and thin humors, their afflux unto the affected part is to be restrained and prevented: but the wound it self is to be kept open, that so the excrements may the more freely flow forth. For the Chiefest cause of pain in Wounds of the nerves is the excrementitious matter shut up; which being overlong detayned getteth to it self a depraved quality, pulleth and twingeth the Nerves, and at length putrifieth. And therefore those Medicaments that are called *Enemata*(although they may be very fit and proper in bloody Wounds, and those of the fleshy parts, in regard that they speedily close & shut up the wound, yet) here in this case are no waies convenient. Neither is water fit & proper no r yet any thing that is cold; since that (as *Hippocrates* writeth in his fifth section, *Aphoris.* 18.) *every thing that is cold is an enemy to the bones, teeth, Nerves, Brain, spinal marrow; but that which is warm, a friend unto them.* Yea neither ought other Medicaments that are actually cold to be administred unto the wounded parts. For seeing that the Nerves are parts voyd of blood, and having in them but very little natural and innate heat, and endued with a most exquisite sense, they are soon and easily offended by any thing that is cold, (it being biting and causing pain) as *Hippocrates* writeth in the 20. *Aphor.* of his fifth *Section*, and as *Galen* likewise teacheth thus, in the sixth Book of his *Method* of *Curing*, *Chapt.* 3. But yet things that are blood-warm are not sufficiently commodious; touching which *Galen*(in his sixth Book of the *Composit:* of *Medicaments according to the kind*, *Chapt.* 2. thus writeth *Let the oyl* (*sayth he*) *with which we cherish the wound be sufficiently hot, lest that otherwise it offend such a wounded part. For like as that which is cold is most of all contrary unto these kind of Affects; so likewise that that is but blood warm is not very much a friend unto them.* And a little after: *and for this Reason* (*sayth he*)*I my self chuse rather to make use of a fomentation of oyl that is sufficiently hot, alwaies shunning that which is but luke-warm, but most of al refusing that which is quite cold.* And yet Nevertheless, if there be a nerve discovered and made bare, *Galen* then administreth rather such things as are but tepid or Luke-warm, then those things that are very hot; as we may find in the sixth Book of his *Method of Curing*, and *Chapt.* 3.

But although that for the asswaging of the pain, that which is hot and withal moyst is most useful and convenient: yet nevertheless, in regard that under those things that humectate and moysten the Nerves do easily putrefy, therefore for all Wounds of the Nerves those Medicaments are most accomodate and proper that in their activity are temperate, (or somwhat tending unt oheat) but that in passives do dry; and that are of thin parts, that may corroborate the weak heat of the Nerves, by consuming and drying up the excrements: touching which *Galen* (in his sixth Book of the *Method* of *Curing*, and 2 *Chapt.*) writeth in this manner: *The faculty of the Medicaments of the wounded Nerves ought to be both thin, and also moderatly heating, and such as may dry without any pain; in regard that this alone can draw the Sanies (or thin excrements) from the bottom of the Wound, without either contracting, or biting of the particle.* And then a little after, *the Wounded Nerves* (*sayth he*) *require such Medicaments that may excite a tepid or luke-warm heat, and may strongly dry; and which from the Nature of their own substance have both a power of drawing, and are of thin parts.* And the same he teacheth us in his third Book of the *Composition of Medicaments according to the kinds*, *Chapt.* 2. And such like Medicaments have in them this benefit likewise, that although they are endued with a faculty of drying, yet notwithstanding they do not conglutinate the orifice of the Wound seeing that they have both an attractive power, and yet nevertheless are free from and void of an Astringent faculty. And yet notwithstanding regard ought to be had unto the nature of the Wounded person; and unto the softer and more tender bodies the weaker Medicaments are to be administred; but unto hard and strong bodies those medicaments that we administer may be the stronger. And there is also regard to be had unto the matter that is to be dryed up; and according to the store of the humidity we are to make choice of Medicaments that are conveniently drying For as *Galen* (in the place last alleadged, to wit, the third Book of the *Composition of Medicam. according to the places*, and *Chapt.* 2.) sayth that in a very copious humidity the increase thereof requireth to be dryed up by a Medicament that is more then ordinary drying; if it be but little, then by a medicament that doth this moderately; and if it be much,

then

then by a Medicament that dryeth much; and yet nevertheleſs, not extremly, neither in the higheſt degree. For there ought to be a proportion anſwerable between the quantity of the humidity and the drying of the Medicament. And if there be alſo any of thoſe drying Medicaments, and of thin parts, (which are of fit uſe in all Wounds of the Nerves) that have adjoyned with them a Notable heat, and a biting Acrimony, and thereupon may eaſily excite both pain and fluxions, (ſuch as are deſtilled Balſams, ſpirits, and oyls) their heat and acrimony (unleſs of its own accord it ſoon vaniſheth, as it commonly happeneth in the ſpirit of Wine) is to be tempred and Mitigated by the mingling together of other things with them.

Such like Medicaments as theſe, that are uſeful in all Wounds of the Nerves, are propounded by *Galen* in his ſixth Book of the *Method of Curing*, *Chapt.* 2. and in his third Book of the *Compoſite of Medicam. according to the kinds*, *Chapt.* 3. 4. and 7. and they ſhal be likewiſe declared by us anon, when we come to ſpeak of the *pricking* of the *Nerves*.

But now that the pain may be aſſwaged, the temperament of the part preſerved, and the Afflux of humors, and the inflammation may be prevented, there are not only convenient Medicaments to be impoſed upon the part affected, (of which we ſhal ſpeak by and by) but even al the parts alſo that lie in the midſt from the wound to the beginning of the Nerves are to be anoynted and cheriſhed with hot oyls, to wit, the Oyl of Earth worms of White Lilyes, the Oyl of a Fox, the Oyl of Coſtus, the Oyl of Caſtor, and the like. And *Galen* commands us thus to do, in the ſixth Book of his *Method*, *and* 3 *Chapt.* And therefore, if the Nerve be of thoſe that appear in the Neck, then the Arm from the Wound even unto the Armpits and the Neck, is to be anoynted. But if the nerve be of thoſe that are found in the Legg, then the Groyns are to be anoyn ted; and we muſt aſcend in anoynting from the Groyns (by the Backbones) even unto the head and Neck.

But ſince that the Prognoſticks, as alſo the uſe of thoſe Medicaments doth ſomwhat vary (according as the Nerve is wounded either by pricking, or by a down-right cut) we ſhal therefore ſpeak of the Pricking and inciſion of the Nerves in ſpecial; out of which thoſe things that in the general ſeem neceſſary to be ſpoken of touching the cure of the wounds of the Nerves, wil the more cleerly appear.

Of the Pricking of the Nerves.

Signs Diagnoſtick.

Now it may be known whether the Nerves be wounded (yea or no) by pricking, from the kind of the weapon it ſelf, and the condition of the Wound; to wit, if it be narrow, and yet notwithſtanding a great and grievous pain followeth; and upon this a beating, an imflammation, a Fever, and a Convulſion: which ſymptomes do never happen, where the Nerve is wholly cut aſſunder. For when the Nerve is wholly and tranſverſly cut in two, it no longer continueth its commerce with the Brain; Neither can it draw the ſame into a Conſent with it; and ſo there can be no pain, neither convulſion excited.

Prognoſticks.

1. The Pricking of the Nerves is the moſt dangerous among al the wounds of the nerves: for as *Galen writes* (*Art. Med.* and *Chapt.* 92.) the *Pricking of a Nerve and a Tendon, by reaſon of the vehemency of the ſenſe, and becauſe that this part is continued with the principal part the head, it is thereupon very apt and ready to excite a Convulſion of the Nerves, and then more eſpecially when nothing at al breaketh forth, the wound in the ſkin being cloſed and ſhut up.* And in his ſixth Book of the *Method* of *Curing*, *Chapt.* 2. he ſaith thus; *Where a Nerve is prickt, there of Neceſſity a pain muſt invade the perſon greater then the pain that is in any other of the parts; and then of neceſſity a* Phlegmone *muſt ſoon follow thereupon.*

2. And yet nevertheleſs the pricking of the Nerve is ſo much the more dangerous, by how much the body that it lighteth upon is impure, and ill diſpoſed: touching which *Galen* (in his ſixth Book of the places affected, *Chapt.* 2.) thus writeth; *If any one whoſe Wounds do eaſily heal be pricked with a Needle, this man although without any Medicament, and the member altogether bare and naked, may betake himſelf unto his accuſtomed labors and buſineſs and yet find nor feel no hurt at al; but if any one whoſe Wounds are hard to cure, ſhal ſo do, (eſpecially if he be either Plethorical, or elſe oppreſſed and ful of bad humors that is to ſay, Cacochymical) this party will indeed at the firſt feel much pain; and afterward likewiſe the part affected wil be infeſted, not only with a Pulſe and beating, but alſo with a Phlegmone.*

3. If in the prickings of the Nerves there appeareth a Tumor, and that it afterward

ſuddenly

suddenly disappear and vanish, then a Convulsion and a Deliry arise, as before (out of the 5. *Sect.* and 65. *Aphorism,*) we acquainted you.

The Cure.

That Indication that is common in all the wounds of the other parts (to wit, that what is dissolved must be again united) this hath likewise its place in the prickings of the Nerves. And yet notwithstanding, in regard that when a Nerve is prickt, (by reason of the Acrimony of the sense which it hath) there followeth a greater pain then in the other parts; and upon this an Inflammation: in the pricking of the Nerves therefore this ought to be the main care and endeavour of the Physitian, that the said pain may (if possibly) be prevented or at least mitigated and moderated, and however that the Inflammation be by all means prevented. Now this is prevented, if there be not heaped up in the wound those excrements that may bring pain Now these may be kept from heaping up, if from all parts of the Body the vitious Humors be not permitted to flow unto the part affected, to wit, the wounded place; and if that those which are gotten together in the wound be not suffered thereto continue, but be forthwith evacuated: Which may be performed if the Skin, as likewise the wound of the flesh that lieth upon the Nerve, be kept open; or if the wound shall not be open enough, that it be made yet wider, and the Skin cut wider by two incisions made at the right Angles, that so by it there may be opened a more free passage forth for those Excrements that are heaped up in the Wound.

And therefore in the pricking of the Nerves there are three things principally to be done; first the Body is to be purged from vitious Humors, the pain to be mitigated, and a passage made for the Excrements, that so they may be emptied forth and taken away.

But now afterwhat manner the whol body is to be purged, we have often told you before. But upon the wounded part there are Medicaments to be imposed, which both mitigate the pain, and open a passage forth for the *Sanies* or thin Excrements, and that draw forth the Excrements that lie hid very deep, even at the bottom of the Wound. And if the wound be over narrow, it is then to be made wider either by a Section made across (in the form of the Letter X) so that the prick be the Center of the Sections, or else by Tents that may dilate the Skin, but yet not touch the Nerve.

And yet nevertheless, for the moderating of the pain, neither is warm water, or that that is hot and moist, thought to be convenient; (since that Water and all cold things are enemies unto the Nerves; and those things that are hot and moist may eallily excite a putridness in the Nerves:) but we ought rather to use Oyl of a thin substance, as that of *Earth-Worms*, or such like. And it will be likewise to very good purpose, to anoynt the part about the wound with Oyl somwhat warm, of most thin parts, and not altringent. Or, if you cannot get enough of such an Oyl, then use the Oyl of white Lillies, of Earthworms, or Camomile, of Dil, or of Melilote. But if the pain shall not yet cease, and that an Inflammation be nigh at hand, it will then be very requisite to impose some Cataplasm to qualifie and mitigate the pain; and this may be made of *Barley Meal, Bean Meal, the Meal of the Vetch Ervum, and that of Lupines, Betony, Camomile flowers, and Oyl fully ripe.* For such like Cataplasms do asswage pain, throughly dry, and discuss, resist putridness, Cherish and strengthen the Native heat; and therefore in the wounds of the Nerves and Tendons they are very fitly administred: and especially, such are then to be made use of, when the Nerves begin to be enflamed, and to putrifie; and then those Cataplasms are to be made with Oxymel or else with a Ley; and the same Cure (almost) is to be instituted, and in the same manner to be ordered, as it is wont to be in a Gangrene but now beginning.

And therefore in this all Authors agree, and Practise it self and experience teach us this, that in all prickings of the Nerves we ought to abstain from all things cold, Astringent, and moist; and that we are to use those things that are hot, dry, and having a thin substance: or (as *Galen* saith) all our Care and Counsel must be directed and tend unto this, that the faculty of the Medicaments be both thin, as also meanly and indifferently heating, and such as may dry without any pain. For these alone can draw from the bottom of the wound the *Sanies* or thin Excrement, without either contracting or biting any the least part thereof.

But although that this indeed be out of doubt, that the Medicaments that are administred unto the prickings of the Nerves have such a like faculty (as ere while we told you of) to wit, to dry up and discuss the thin Excrements, and to draw from the bottom of the wounds; but then whether they yet do nothing else but this, and whether their being administred be to no other end, of this I much doubt. And that which causeth me so to doubt, is that which hath been spoken above in the *eight Chapter*, touching Sarcoticks.

Sarcoticks. For whereas in that place I have shewn, that it is not at all absurd to determine that the chief and principal end of all Sarcotick Medicaments is this, that they may Corroborate the heat of any part whatsoever, that so Nature in the generating of flesh may so much the more rightly discharge its office; this is especially requisite in the wounded Nerves, Tendons, and Ligaments. For since their heat is far more weak then that of the fleshy parts, this heat is yet further debilitated in those that are wounded; and therefore they are not able rightly to Concoct and Assimilate the Aliment that floweth unto them; and from hence it is, that this Aliment is converted into *Sanies*; and by how much the greater the weakness is, by so much the greater is the store of such *Sanies* that floweth out. And moreover in regard that the Nervous parts are endued with a most exquisite sense, they are easily affected with a pain likewise, upon occasion of which the vicious Humors flow unto them from al other parts of the Body. And from hence it very often happeneth, that from the wounded Joynts, (and especially in the Arm, or Knee; and yet more especially, if there be present an Inflammation) there is never any laudable *Pus* generated, but there floweth forth great store of this *Sanies*, which our Chirurgeons cal *das Glied VVassel*, or the *Joynt Water*; and some of the more ignorant of these Chirurgeons think it to be the genuine Humor of the Joynt it self; and thereupon they endeavour to obstruct and stop the afflux thereof, by I know not what kind of Medicaments; when as notwithstanding there cannot be conteined so much Humor in all the Joynts of the whole Body, as we shall sometimes have flowing forth of such a wound in one day: and the said Flux can no way be stanched, unless unto the wounded part there be restored its own Natural Temper: of which likewise *Johannes Langius* gives us notice, in his *Preface to his Medicinal Epistles*; and in his *first B.* and *third Epistle*.

But now for those Medicaments which experience hath taught us to be very useful in al wounds of the Nerves and Tendons, and more especially in the Wounds that are caused by prickings, they are, *Oyl* fully ripe, such as is two yeers old, rather then new; the *Oyl* of *Earth worms*, of *Rue*, of *white Lillies*, of *Costus*, of *Castor*, of *Turpentine*, (this last may be used alone of it self in Children, Women, and such as are of a more moist and soft Constitution of Body; but in such as have drier Bodies, there may be some *Euphorbium* mingled therewith) *Ammoniacum*, *Galbanum*, *Root of round Aristolochy*, *Dittany*; and generally all Roots that are bitter without Astriction; Propolis of Beehives, in the same manner, either alone, or else with *Euphorbium*; instead of *Euphorbium Sagapenum* may likewise be therewith mingled; the *destilled Oyl of Turpentine*, *the Sweat or Tear of the Fir-Tree*, and other Artificial Balsams. *Galen* likewise commendeth an Emplaster that is made of *Wax*, *one part*; *Turpentine and Pitch*, *of each half parts*; *Euphorbium*, the twelfth part: touching which see further in *Galen* his *sixth B.* of the *Meth. of Curing*, *Chap.* 2. where he taketh great pains, and is very Exact and Large in treating of the use of *Euphorbium* in the wounds of the Nerves; the Sum and substance of al which is this. Whereas no one can possibly comprehend the use of *Euphorbium* by measure, both by reason of the different age of the *Euphorbium*, as also by reason of the various Natures of Bodies; we ought therefore to heed what this *Euphorbium* is, to wit, whether new or old, and in what proportion it is to be mingled. For the old (which is more yellow and more Pale then the New, but more hard and dry of Consistence) is less efficacious; and although that it keep some of its virtue unto the third yeer, yet in the fourth, fifth, or sixth yeer, it is then so decaied, that in the process of time it is altogether useless and good for nothing. And therefore the new is to be mingled with a triple quantity of *Wax*. As,

Take *Euphorbium*, *one ounce*; *Wax*, *three ounces*; *Oyl*, *ten or twelve ounces*.

But when it is become a little old, it ought then to be mingled in somwhat a greater proportion; and there must be added thereto one part and half (or two parts if it be three or four yeers old) more then formerly when it was new: that is to say, a double weight unto the former; or if you please it may in weight be equal unto the *Wax*, in which thing notwithstanding use is much to be heeded and attended. For if the wounded person shall complain of any biting that he feels from the said Medicament; and the parts lying about the Puncture shall appear to be hot, then the Puncture or Pricking it self is somwhat more swelling then is fit, and the Lips of the wound wil be some thing affected with an Inflammation; and we may conclude that the Medicament is stronger then it ought to be: and therefore either the strength of it is to be abated and qualified by the admixture of the greater store of Oyl, or else the older *Euphorbium* is to be taken. But if the Contrary shall happen, then the strength of the Medicament is to be augmented, either by mingling a greater quantity of the old, or else by the admixture of the newer *Euphorbium*: for that mixture that hath in it a triple proportion of *Wax*, is the strongest; that which

hath a five-fold quantity of the said *Wax*, the weakeſt; and the mixture having but a quadruple proportion of the Wax, is in a mean betwixt both.

Galen (as we may ſee in his *third B. of the Compoſit. of Medicaments according to their kinds*, and 2. *Chap.*) mentioneth likewiſe other things that are to be made uſe of, as *live Sulphur, unſlaked Lime waſhed; Arſenick, Sandarach, Pompholyx, the ſcourings of Braſs, Chalcitis (or red Vitriol) burnt.* But in all theſe he had only a regard unto their drying faculty; and he would only have the Medicaments to be ſo made and Compounded, that they might be able to cal forth and conſume the Excrements out of the Wounds of the Nerves. But unto me (as I told you before) it ſeemeth far more probable, that ſuch Medicaments are to be made choice of, that may withal Corroborate and Augment the Native heat of the Nerves, which of it ſelf (and eſpecially in the wounded Nerves) is very weak.

And therefore this latter Age hath found out Medicaments that are far more ſafe; both ſuch as are prepared by the Chymical Art, as alſo ſuch as are brought unto us out of other Countries; yea and ſuch as are very ordinary at home among our ſelves; and ſuch as do their office without cauſing any pain (that is eaſily brought upon the Patient by the uſe of thoſe ſtronger Medicaments that the Ancients made uſe of) and which may be ſafely applied, whether the Nerve be naked and bare, or whether it be covered (whereas in the Nerve that is bare all thoſe Medicaments of the Ancients cannot be made uſe of with any ſafety) ſuch as are theſe; *Balſam of Peru, the diſtilled Oyl of Roſin Turpentine, and the Roſin of the Fir-Tree, Wax, Oyl or Balſam of St. Johns wort, the ſpirit of Wine, Gum Elemi, Gum Tacamahaca, and Gum Caranna.* All which obtain that faculty which by *Galen* and the Ancients is propounded, and have in them no Corroding quality at all; and withal obtain a Balſamick virtue (as thoſe of our times term it) which thoſe other of the Ancients are void of; and they do not only conſume the Excrements, but they likewiſe greatly ſtrengthen the Native heat of the wounded part, and are all of them very agreeable and ſuitable unto the Nerves. *Cæſar Magatus*, in his *ſecond B. of Wounds, 5. Chapter*, mentioneth theſe ſeveral forms following.

Take *Ammoniacum, Opopanax, Sagapenum, diſſolved in hot water; Propolis, and Turpentine, of each half an ounce; Oyl of thin parts, two or three yeers old, in which Earthworms have been boyled, one ounce and half; Mingle them, and make an Unguent.* Or,

Take *Cleer Turpentine, the exſudation or tear of the fir tree, of each one ounce; Tacamahaca, half an ounce; Caranna two drams, Balſam of Peru, three drams; Propolis ſix drams; our oyl of St. Johns wort, one ounce; Mingle them, and make an Unguent;* Or,

Take *Sagapenum, Opopanax, Propolis, of each half an ounce; Tacamahaca three drams; the deſtilled oyl of Turpentine, or the ſweat of the fir tree, one ounce; Sulphur that hath not come neer the fire, one dram and half; Mingle them, and make an Unguent.* Or,

Take *Tacamahaca, Opopanax, Propolis, the ſweat of the Firtree, of each two drams; Artificial Balſam, ſix drams; Mingle them, and make an Unguent.* Or,

Take *Artificial Balſam, our oyl of St. Johns Wort, of each half an ounce; Burning water (which the Latines call Aqua ardens) or the water of Balſam, three drams, and mingle them.* Or,

Take *Diachylon with Gums, one ounce; Tacamahaca, Caranna, Sagapenum, Propolis, Roſin of the Pine, Ship-pitch, of each three drams; Artificial Balſam, half an ounce; Euphorbium two ſcruples; Mingle them and make a cerot.* Or,

Take *The oldeſt Leaven one ounce and half, Doves dung, or Brimſtone, one dram; Aqua Ardens, or Water of Balſam, as much as will ſuffice; that the Medicament may have the conſiſtence of Honey; and ſo mingle them.* Or,

Take *Oyl of Turpentine, or the ſweat of the Fir tree, one ounce; Sagapenum, Propolis, of each half an ounce; Euphorbium one dram; mingle them.*

And if the Medicament that is layd on be of a thin ſubſtance, or (as the Chymiſts ſpeak) volatile, which may eaſily be diſſipated; then we are to mingle therewith all Turpentine and Gum Elemi; or elſe we muſt impoſe an Emplaſter of Gum Caranna, Tacamahaca, diſſolved in the compound Oyl St. Johns wort.

The Diet.

There is likewiſe regard to be had unto the diet. The Air in which the Patient is moſt converſant ought to be ſomewhat more warm then ordinary, ſince that the Cold is an Enemy unto the Nerves; as in the fifth *Sect. Aphoriſ.* 18. And therefore likewiſe the Wounds of the Nerves are not over often and without very great cauſe to be uncovered; and when they are uncovered, a Candle muſt be lighted, and a pan ful of hot coals muſt be in a readineſs; and this new binding up muſt be haſtened, and performed with all poſſible ſpeed. Let the ſick perſon abſtain from wine. The affected part is ſoftly and gently to be placed, and kept in quietneſs. For (as *Celſus* ſaith, in his fifth

fifth Book, and *Chapt.* 26.) the best of all Medicaments is Rest and quietness: and to move and walk (unless for such as are found) is altogether unfit and improper. Yea moreover, we have two histories that tells us, that Laughter may bring very much danger and damage in the wounds of the Nervous parts. These Histories we find taken notice of by *Guilhelm. Fabricius*, in his *first Century*, *Observat.* 23. Let Anger likewise, and the passions of the mind be avoyded. And let the patient at this time abstain from Venery that which is of all other things most hurtful unto him; as we are sufficiently taught by the history of that young man in *Guilhelm. Fabricius* his *first Cent. Observat.* 22. who being now almost perfectly wel, and recovered, dyed upon this very cause and no other.

Chap. 16. *Of the downright Wounds of the Nerves, as also of the Ligaments, by Cutting.*

But now if the Nerve or Tendon be wounded not by pricking, but by a downright cut, we are then to look whether the wound be longwaies, or whether it be transverse, and overthwart: and then whether the Nerve be wholly cut assunder, or else be but only in part Wounded; and how much of the skin lying over it is divided.

Signs Diagnostick.

The pain, if the Nerve be Wounded by a Cut, but not wholly divided and cut assunder, is not so great as if it be Wounded by a prick: and yet nevertheless for the most part it is even great enough. But if the Nerve be wholly cut assunder, there is then no pain at all felt, but yet nevertheless the sense and feeling, or else the motion of the part into which the Nerve is inserted, is taken away. And so likewise if the Tendon be wholly dissected, the motion of the Member is taken away.

Prognosticks.

1. If the Nerve be Wounded in the length thereof, then there is no great fear of a Convulsion, seeing that the fibres are not so much affected: but if it be wounded transversly, and yet not wholly cut in two, it may indeed bring upon the person all those symptoms (to wit, pains, inflammations, a Convulsion, and Deliryes or Dotings) which the pricking of the Nerve doth: because that from the fibres that are cut assunder the pain and hurt is communicated unto those fibres that are not dissected and divided; and from hence proceed pains, fluxions, inflammations, and other evils; and at length the Malady is communicated unto the brain it self; from whence there arise Convulsion fits and Deliryes.

2. But if the Nerve be wholly dissected, it doth not indeed bring along with it so much danger, neither is there any fear of a Convulsion: but yet nevertheless there is another incurable Malady that followeth it, to wit, a debility both in sense and motion of that part into which the Nerve is inserted, whenas the animal spirit can no longer be carried by the Nerve into the said part.

3. If any Tendon shall be wounded, but not wholly dissected, it causeth a debility of motion in that part that it moveth: but if it be altogether cut assunder, then the motion of the said part is altogether abolished and taken away.

4. If there flow forth great store of *Sanies* or thin excrement, it is then a sign and token of that ill constitution of the part affected; and that it is inflamed, and altogether in great danger. Now this *Sanies* floweth forth according to the various disposition of the part affected, sometime resembling as it were water, and somtimes like whey of milk; and somtimes as it were white and milkie; but that which floweth forth of the Tendons is more glutinous, like unto the white of an Egge. And I wel remember that in a certain Student there issued forth of his knee that was much wounded (day by day) a certain matter like unto the white of an Egg, but that it was somwhat whiter, and a little thicker; (and yet nevertheless altogether such as *Celsus* describeth in his fifth Book, and *Chapt* 26. which he calleth *Meliceria*, because that it is like unto white honey;) which flowed forth in that abundance, that an Eggshel could scarcely contain it.

The Cure.

The way and Method of Curing these Wounds is in the most the very same indeed with that which we mentioned in the foregoing *Chapter*; yet notwithstanding there are some things that are peculiarly to be attended. As first of all, those Nerves that are wounded by a downright cut are most commonly left naked, and bare of any skin to cover them and therefore we are to use our best endeavor, that they may not be exposed unto the external Air, in regard that the external cold Air (as we have often told you) is an enemy unto the Nerves. And therfore we are to do the utmost of our indeavor, that (as much as possibly may be) they may be covered with their own proper covering, and the skin that lieth upon it; and therefore if the Nerve be wounded according unto

its length, then with a swath the lipps of the Wound are to be drawn together and conjoyned; but if the Wound be transverse, and that necessity so require, there is then a future or sewing of the lips to be attempted; and yet great care must be taken, and all diligence used, that (if the future or stiching be wrought with the needle, which yet notwithstanding may easily be avoyded, as we told you before) the Nerve it self be not touched with the Needle. For if in the sewing it should chance to be prickt, the very same symptoms may happen that are otherwise wont to arise in the pricking of the Nerves. And yet nevertheless the wound is so to be drawn together, that there may still stand open a free passage forth for the *Sanies*; which (if need so require) may be done with a Tent; lest that if the said *Sanies* be retained and kept in it should corrupt and putrify the nerve. The nerves also when they are wounded will not bear those stronger biting Medicaments, of *Euphorbium*, and the like. And therefore in such kind of Wounds as these *Galen* was wont to use a Medicament of quick or unslaked Lime often washed with much oyl of roses mingled therwith; as also that Medicament of Pompholyx, if it be mingled with good store of oyl of Roses. But those Medicaments that have been found out by those of latter times are safest of all other; of which we have already made mention in the *Chapter* immediatly foregoing. But then the Wound it self may be externally covered with the *Emplaster Diachalcites*, or *Diapalma*, or the *Nerve* Emplaster, or any other that shal be known to be fit and convenient. *Galen (in his third Book of the Composit. of Medicaments according to their kinds & the third Chapt.)* propoundeth and mentioneth these kind of Emplasters; and there are many likewise of them extant in the writings of the latter Physitians; of which we have also in the former *Chapt.* 8 (touching vulnerary Medicaments) made mention; and given you some of the Chief of them. And this Unguent is also very good and useful; which they usually term the Unguent for the Worms.

Take *Centaury the less, the lesser Plantain, Hounds tongue, Mouse-eare, the greater and lesser Consound, the herb horse-taile, and Milfoyl, of each of these one handful; of Earthworms half a pound, Common oyl one pound, Wine one pint and half, Vinegar four ounces. Let them be al wel mashed and throughly mingled together, and so let them stand fermenting for seven daies together. And then after this, adde thereto, of the sewet of a Ram taken clean from the skin one pound; Ship pitch and Rosin, of each one quart. Gum Ammoniacum, Galbanum, Opopanax, dissolved in Vinegar, of each half a dram: let them be all boyled together over a moderate and gentle fire, until the wine and the Vinegar be all consumed, and then let them be strayned. And so soon as they shal be cold, add of Turpentine one ounce and half; of Frankincense, Mastick, Sarcocol, of each three drams; Saffron two drams; let them be wel stirred about with a Spatula, or else with a Pestle in a Mortar: and if it seem good, to cause a Consistence, Wax may also be added.*

And whereas by reason of the Scarcity of natural heat in the Nerves, there can hardly be made a good suppuration, but rather a Putridness and Corruption of the humors; a Cataplasm that may inhibite and resist the said putridness is to be imposed: which wil likewise perform this good office, to wit, of defending the Nerve (unto which cold is an Enemy) from the Injuries of the External Air. This following is also very useful.

Bean Meal, Barley Meal, and the Meal of the Pulse Ervum, the pouder of Camomil flowers, and Red Roses, as much as you think fit; with Oxymel simple, and the Oyl of Roses and Earthworms Compounded together, make a Cataplasm.

And seeing that in the Nerves transversly wounded, and yet not altogether cut assunder, the Brain by the fibres that are whole and entire may easily be drawn into consent, so that a Convulsion may be excited; this Convulsion ought (as much as is possible) to be prevented, by those Medicaments that have hither unto been propounded; and if it shal happen, you must remove it by those Remedies that we shal set down below in the *Chap.* 23. or if this may not possibly be done and that the Medicaments are not sufficient to effect it, then the whole Nerve is to be cut in sunder, that so the Convulsion may be removed. For although that thereby the part be somwhat debilitated, and may come to suffer a stupidity and insensibleness or else some hurt of the motion; yet better it is to bear this inconvenience, then suffer death.

Of the Wounds of the Ligaments.

The Ligaments (in regard that they are voyd of sense) when they are Woeundd produce neither pain, nor Convulsion; neither do they of themselves communicate their Affects unto the Brain. And more especially, the wound of that Ligament which tendeth from one bone to another, is most of all free from danger. But that which is inserted into a Muscle, (in regard that it is able to draw the Nerves and Tendons into a consent with it) if it be not rightly cured may bring a great deal more danger along with it. For because that even the very Ligaments

gaments themselves have but a very weak heat, therefore they wil not easily bear Wounds; but they are very apt and ready to heap up many excrements, that may contract a Putridness, and excite other Maladies and mischiefs; and therefore of those Medicaments that are useful in the Wounds of the Nerves and Tendons, those of them that are most drying are to be administred: and indeed we may with safety enough make use of them, since that this part is destitute of sense, and therefore may not easily be offended with the Acrimony of the said drying Medicaments. But yet nevertheless, in regard that it seemeth to me, that (as we told you before in the foregoing *Chapter*) such like Medicaments are wont to be administred not only for drying, but to the end likewise that they may cherish and strengthen the weak heat of the part, therefore we conclude that such of these drying Medicaments are to be made use of that do no way debilitate & dissipate the weak heat of these parts; but rather such as do cherish and Corroborate it.

Chap. 17. *Of the Wounds of the the Joynts.*

THe Wounds of the Joynts are very neerly related and of kin unto the Wounds of the Nerves; to wit, those that happen in the Elbow of the Arm, the Knee, or the Joynts of the fingers: and these are either with a luxation or loosness of the Joynt, or else without it.

Prognosticks.

Now al such Wounds are dangerous; since that the Joynts are very apt and readily prepared to receive the fluxions, as being such parts that are voyd of flesh, hollow, and which are knit together by Membranes and Membranous Tendons, and are easily assaulted with pains; whereupon arise Inflammations, Watchings, Deliryes, and Convulsions: and such like Wounds as these do easily degenerate into Ulcers of an ill and dangerous nature and quality; as *Galen* writeth in his fourth Book of the *Method of Curing*, and sixth Chapter.

2. And they are yet more dangerous in an internal part; becaufe that in that place the greater vessels and the Nerves are conteyned; where upon there are also the more notable and considerable hæmorrhages and Convulsions easily excited.

3. Touching these same wounds *Hippocrates* likewise writeth after this manner: *Those Wounds (sayth he) that are inflicted in the Joynts, if the Nerves be altogether cut assunder, (that contained them) without doubt they will render them lame. But if there be any doubt, how and in what manner the Nerve may be affected, if indeed the Wound be straight from a sharp Weapon, that which is transverse is better then it. But if the Weapon that inflicted the Wound be heavy and blunt, there is then no danger. But we must here consider both the depth of the Wound, and other like signs of this nature. If any* pus *happen at the Joynt, there is then a necessity that the Joynt should be rendered the harder. And if likewise the tumors shal withal persevere, there is then a necessity that the joynt should be rendered the harder. And if likewise the tumors shal withall Persevere, there is then a Necessity, that this place must be hard for a long time, and that the Ulcer being whol, the tumor or swelling stil remain. But in those where nothing is to be expected but the cutting off of the Nerve, there we may with the more confidence foretell a lameness to follow, and this more especially, if any of the inferior Nerves shal be loosened. But now whether or no the Nerve be to be cut off, may be discovered by these signs; if there flow forth under it a white* pus *that is thick, and of a long continuance, and that there arise pains and inflammations at the Joynt, about the very beginning: which are likewise wont to happen when the bone is to be cut out.*

4. The same *Hippocrates* (in the place alleadged) saith thus: *Those things that are cut assunder in the Elbows, (especially with an inflammation) are at length brought unto a suppuration, and cutting, and burning.*

5. But these Wounds are made yet the more dangerous, if there happen withal a loosening of the Joynt: for then the Joynt cannot be set and put back again into its place without endangering the life of the Patient, by reason of those pains that do perpetually accompany these kind of wounds. And therfore the Physitian may do wel to save his credit by heeding the Prognostick, lest that otherwise he be il spoken of by the common sort of people. For otherwise, if he wil adventure to put back the Joynt into its former place, and that the Joynt when it is put back so continue, it bringeth death unto the sick person; and it hath been commonly seen, that upon a very smal Wound death hath followed. For when with such a Wound a luxation or looseness of the Joynt doth happen, the Nervous parts about the Joynts do suffer a distraction; upon which there are caused fierce and cruel pains, and fluxions: but if the Joynt be brought back unto its place, the same parts are again extended; and so of necessity there must happen inflammations and convulsions, which unavoydably are communicated unto the Brain: and withal

from

from the afflux of the matter proceeding from so many distractions and extensions the heat is suffocated, and so there followeth a Gangrene, and Sphacelus. Wherefore if any such Wound be brought unto the Physitian to Cure, let him acquaint the standers by with the danger of the Patients life, and let him likewise give them notice of the feaver that will follow, and that a Convulsion will likewise happen in a very short time, if this bringing back of the Joynt be attempted, and accordingly effected. Touching which *Hippocrates* (in his *B. of the Joynts*, Text 74.) speaking of the Ankle-bone, thus writeth: *But whosoever they be* (saith he) *that upon any Wound there inflicted have their Ankle-bones out of Joynt, and altogether sticking out from the Joynts of the Foot, they ought not to be returned and put back again into their places: but they are to be permitted so to continue: and if any Physitian wil adventure to put them back, let him know for a certain, that if they so continue when they are set, the Patients are not like to live, and that their life is like to be but for a very few daies; for there be but few of them that live beyond the seventh day: for that which destroies them is the Convulsion. Add this likewise, that it often happeneth, that both the Ankle and the Foot are taken with the Gangrene. And we may be most certainly assured, that these things will thus come to pass.* And of the Elbow, (Text 16.) he saith thus: *The very same happeneth in the bones of the Elbow: for if these bones also (upon any Wound of the Hand-Wrist) be made to stick forth either toward the interior or the exterior part of the Hand, we are to know for a truth, that the persons who have these bones brought back and set in their former places, (if they so abide) they shall within a few daies die the same Death that we told you of before:* And touching the Thigh-bone, (Text 77.) *And if* (saith he) *the Thigh-bone be fallen forth by reason of any Wound inflicted upon the Knee, if it be again replaced, and so continue, it speedily bringeth a more violent Death, then in the cases aforesaid.* And afterwards; *And the very same is likewise to be said as touching the Joynts of the Hand-Wrist, and of the Arm. For whatsoever they be of these that upon a Wound are dislocated and loosened, and hereupon stick out, if they shall again be put back into their places, they certainly cause Death.*

6. And yet notwithstanding the lesser Joynts if they be brought back, and replaced, they do not necessarily bring Death; but many of them are preserved: touching which *Hippocrates* (in his *B. of the Joynts*, Text. 78.) writeth thus: *But now* (saith he) *if any upon a Wound have the Joynts of their Fingers, or of the Foot, or of the Hand, loosened and sticking out, there being indeed no bone broken, but drawn away in the very Coherence, these if the Joynts be again replaced (and shal so continue) have indeed the danger of a Convulsion threatening them, and nigh at hand, unless they be rightly Cured.* And *Galen* (in his 3. *B. of Fractures*, Text 16.) saith: *If the smal Joynts, to wit, such as are found about the Fingers, chance to be wounded, and dislocated, neither then also is the Cure altogether free from danger; for if these persons do notwithstanding escape and recover, most of them obtain this their recovery through the great diligence and pains taken in the Cure.* And afterwards he addeth: *It is yet nevertheless to be expected, that the Joynts about the Fingers that are brought back to their former places will again fall forth; for so for the most part it happeneth, if there follow but any the least Inflammation thereupon. Wherefore if there were no fear that the Physitian would be accused and discredited by reason of the Ignorance and unskilfulness of the vulgar, there were not any one of these to be brought back unto their own former places.* And which that the Physitian may the better avoid, and may not hasten the Death of the Patient, he ought not so much as to undertake the replacing of the Joynt. But then if the Physitian shall not order the Joynt to be brought back and set in its former place, he shall by the vulgar be accused of ignorance and unskilfulness, and as one that hath made the Patient Lame or maimed. Wherefore the Physitian in this Case is to preserve his Credit and Reputation by the aforesaid Prognostick, and foretelling unto the standers by the danger of Death that may in thus doing accrue unto the sick party.

The Cure.

The Cure of these wounds, if they be without any Luxation or loosening, is almost the same as was that before of the Nerves. To wit, the lips of the wound are indeed again to be drawn together, but yet not wholly, if the Wound be deeper then ordinary, that so there may be an open passage forth for the Humors that are easily gathered together. And seeing that the Joynts especially have in them but little heat, they are therefore in the best manner that may be to defend them from the injuries of the external Air. Wherefore not only those Unguents and Emplasters that are used in other Wounds (especially those of the Nerves) are to be imposed; but likewise those Cataplasms, of which mention was made above in the *eighth Chapter*. As,

Take *Pouder of Marsh-mallow Root, half an ounce; Betony, flowers of Camomile, and Melilote, of each one ounce; the meal of Linseed,*

seed, and Fenugreek seed, of each one ounce and half; of Beans, one ounce; and make a Cataplasm.

The afflux of the Humors is likewise to be prevented; and therefore the whole body is to be evacuated with al diligence; and the Humors that flow are to be intercepted, and turned quite out of the Body.

It matters very much likewise, that the member be rightly Scituated and placed, that the pain and the afflux of Humors may be prevented, and the action of the member preserved.

If therefore the fore part of the Shoulder be wounded, then let a thick bolster be put underneath the wing thereof, and likewise wrapt up in something that may bear up the Arm, and drive up higher the top or head of the Shoulder. For the top or head of the Shoulder being drawn downward by its own proper weight causeth that the Wound is cured much the more slowly. If the Wound be inflicted upon the Joynt of the Elbow, the Arm is then neither altogether to be kept stretched forth straight, neither is it too much to be bended inward, but it is to be placed in a middle posture, resembling an obtuse Angle. Which Scituation of the part that it may be so preserved, and by the sick person whilest he sleepeth (or else through Incogitancy) not altered, it is to be kept in that posture either by fit and convenient bindings up, or else by wooden Instruments made fit for that purpose. The Hand-Wrist being wounded, or the Joynts of the Fingers, the Hand is to be kept half bended, and the Fingers not stretched forth, lest that a Cicatrice being brought over them the Hand should abide stiff, and be hurt by its contraction. If the joynt of the Thigh be wounded, let the sick person lie upon his back, and with fit little Pillows and bindings let the Huckle-bone in the head thereof be contained and kept in its proper place; and until the Cicatrice be brought over it, the sick person must be commanded that he sometimes move and stir his Thigh this way and that way; lest that the Cicatrice being brought over it, there should happen a hurt of the motion by means of the said Cicatrice. The Knee when it is wounded must be stretched forth, and placed in a right and straight Figure, that so Lameness may be prevented.

A Wound with Luxation.

But now if the Wound be with a Luxation or loosening of the Joynt, if the Joynt that is loosened be great, the putting of it back again into its place is to be omitted; and the sick person is to be told before hand of the Lameness and danger that would follow thereupon: and the fluxion is by all manner of means to be turned away; and the pain to be mitigated; and the Member to be placed in such a posture as may seem most grateful and convenient unto the Patient, and such as may bring the least pain unto him; provided stil, that the Member hang not down, lest that there should be an occasion for an afflux of the Humors. But the wound is to be Cured like as other Wounds; but yet nevertheless it is not to be bound up in the same manner as other wounds are. And great care must likewise be taken that it be not offended by the external cold of the Air. Cataplasms are likewise to be imposed, not upon the Wound it self, But upon the parts that lie neer unto it, lest that by any means the part should by the weight thereof be grieved and butthened. And in regard that fluxions are easily caused (in this case) unto these parts, and thereupon the Cure the longer ere it be perfected; therefore the Body is by often purgations, and likewise by sweats, to be purged and cleansed from all its vitious and superfluous Humors.

Chap. 18. *Of a Wound with a Contusion.*

AND seeing likewise that the quality and Condition of the instrument wherewith the Wound is inflicted may cause a difference of the Wound we are therefore here not to pass this over in silence, without speaking something unto it. For some wounds are inflicted by sharp Instruments or weapons, and others by those that are obtuse and blunt; which doth not a little vary the Cure. And indeed the Cure of Wounds made with sharp Instruments may sufficiently appear by what hath hitherunto been said: and as for what is peculiar unto Wounds that are inflicted by blunt Weapons, we will here in this Chapter declare it. Now that kind of Unity dissolved that obtuse and blunt Weapons cause in a soft part, is called a Contusion. And indeed it is properly termed a Contusion, when the superficies of the part (or the Skin) being whole and entire, those soft parts that lie under it are bruised, and as it were battered together; of which Contusion some mention hath likewise been made above, in the *first Part*, and *sixteenth Chapter*. And yet nevertheless, now and then, the part is not only bruised within, but it is also externally wounded in the superficies, where the Wound is joyned with a Contusion; and touching this Contusion it is that we intend here to treat; of which we shal notwithstanding so order our discourse,

A Wound with a Contusion.

that

that what is to be done in every Contusion may manifestly appear.

The Causes.

Now a Contusion is caused in Wounds, when the Weapon or Instrument wherewith the Wound is inflicted hath not only a power of cutting and making an incision, but likewise of bruising and battering the part upon which it lighteth; and this is done, when the Weapon or Instrument is blunt, or heavy; or when a man is thrown against somthing that is hard: in which manner also the soft part may be bruised without a Wound, or else with a Wound.

Signs Diagnostick.

Wounds with a Contusion are known by the instrument with the which the wound was made, to wit, if it be blunt and heavy; and then in the next place from the pain, and the black and blew color of the part.

Prognosticks.

1. A Wound with a Contusion is more dangerous, and more difficult to Cure, then that which is without a Contusion. For the bruised parts, and the blood that is poured forth, if they be not discussed, they must of necessity be turned into *Pus*, or otherwise before this is done the Wound cannot be Cured.

2. And if the bruised part, and the blood poured forth of the broken Vessels begin to putrefie, it may excite and cause a Gangrene.

The Cure.

In regard that no wound that hath any other affect that hindereth the Curing thereof Joyned with it can be cured until the said Affect be removed, and that the part it self be rightly disposed; it from hence easily appeareth, that our first care must be directed unto the cure of the Contusion. And when the Contusion or bruise is once taken away, the rest of the Cure is to be performed in the manner and form aforesaid.

But then, seeing that what is bruised cannot be restored again, and made entire as before, and that the Blood which is poured forth of the Vessels may stick in another place, (where it ought not to be) and so may be easily corrupted; therefore we ought first of all to endeavour, that both of them may be taken away: and that they may either be discussed, or else converted into *Pus*. And because that there is evermore caused an afflux of the Humors unto the bruised part, by reason of the pain that attendeth the said Contusion; therefore, first of all, Universal Revulsions (and chiefly Venesection or opening of a Vein, if need so require) are to be administred. And then in the next place, that there may flow no more of the Humor unto the part affected, Defensives and Repellers are to be administred; touching which we have spoken above, in the 1 *Part*, *Chap.* 16. which ought to be such that they will no way admit of the afflux of the Humor; and withal that they may consume and dry up some part thereof.

And when there shall be no further cause to fear an afflux of Humors; then we are to do our endeavour that that which is bruised, and the Blood which being forth of the Vessels sticketh in the bruised part may speedily be turned into *Pus*: as *Hippocrates* teacheth us, in his *B. of Ulcers*: *If* (saith he) *any of the flesh shall be battered and bruised by the Weapon, we are then to take care, that it be* (as soon as may be) *converted into Pus, for as it is less dangerous then an Inflammation; so there is also a necessity, that the flesh being battered and bruised by the Weapon should being converted into* Pus *waste and consume away, and then a new Flesh be bred instead thereof.* Now what those Medicaments are that move and forward the *Pus*, we have elsewhere told you. But in the use of them, in regard that they are hot and moist, we ought to have a special care that we apply not those things that are over moist; since that by the use of such Medicaments, putridness and the corruption of the part may easily be excited: and therefore certain Discussives are to be added. *As*,

Take *of Marsh-Mallow Root, one ounce; wild Cucumber, half an ounce; Organy, and tops of Dill, of each half a handful; Fat dry Figs, six in number*; boyl them all to a softness, and then pass them through a hair sieve: then add *the pouder of the flowers of Camomile, the meal of Lin-seed, and Fenugreek seed, of each half an ounce; Dragons Blood, three drams; Styrax liquid, Galbanum, and Mirrh, of each two drams; Saffron, one scruple; Oyl of St. Johns-wort, and Hoggs Fat, of each a sufficient quantity*; Mingle them, and make a Cataplasm. But now these Cataplasms are not to be imposed upon the Wound it self, but they are to be laid on round about, where the part is bruised. And this very thing *Hippocrates* teacheth us in his *B. of Ulcers*, where he thus writes; *When it seemeth requisite that the Wound should be fortified and fenced with a Cataplasm, it ought to be brought back from the Wound, and laid upon the parts next unto it, that so the* Pus *may pass forth, and those things that are hard may be softened*

But

But upon the very Wound it self there is to be anoynted a Digestive made of *Rosin Turpentine, and the yelks of Eggs, or Triapharmacum, or the Unguent Basilicon*, or the like, out of those things that we mentioned before; and then upon this Liniments dipt in the same Digestive are to be imposed.

The *Pus* being bred, the Wound is then to be cleansed with convenient Medicaments; and then to be filled up with flesh, and Consolidated.

But if that which is bruised be not changed into *Pus*, but that on the third, fourth, or fifth day a Tumor arise with a pain, and so increase from day to day, & that a beating pain be excited, so that the sick person cannot wel bear the touch of that place, and that at length the fresh and flourishing colour in the part be extinguished, and the part tend unto a yellowishness, and that the pain and beating remit, and that there be present other signs and tokens of a Gangrene neer at hand; then the part is to be scarified, and the *Egpptiack Unguent* laid thereon; and the Cure is so to be instituted and ordered as we told you in the *place alleadged* (to wit, *Chapt.* 16. of the *first part*) and as is wont to be done in case of a neer approaching Gangrene; touching which we have already spoken in the 2. *Part*, *Chap.* 19.

But if not the flesh alone, but likewise the Nerves, Tendons, and Ligaments be bruised: the Nerves indeed and the Tendons if they be bruised without any Contusion of the Skin, they are to be cherished with warm Oyl that hath in it a Discussive virtue, as for instance, *the Oyl of Rue, Orrace, Dill, and sweet Marjoram*. But if withal the Skin be bruised, first of all, *the white of an Egg* mingled with the *Oyl of Roses* is to be laid on, to mitigate the pain. And then the pain being somwhat moderated, the part is to be cherished and fomented with Astringent Wine; and afterwards (according as *Galen* writeth that it was in frequent in use with Wrastlers, who have oftentimes such bruises befalling them) a Cataplasm of *Bean-meal* and *Oxymel* is to be imposed. There is here likewise much commended the *Leaves* of the *Elm* boyled in Oyl, and applied; as likewise the *Ashes* of the *smal shoots* of the *Vine* mingled with the *Fat* of a *Hen*, and *Vinegar*. And if some extraordinary Vehement pain be joyned together with the affect, then *Liquid Pitch*, with *Oxymel* and *Bean-meal* may be mingled, boyled, and laid on as hot as the Patient can well endure it. But if we see that there is cause of more drying, then we may mingle with the former the *meal* of the Pulse *Ervum*, or the *Pouder of the Orrace Root of Illyrium*; and the place ought to be anoynted with the *Oyl of Camomile, of Dill, of Orrace; and of Rue*, with any one of them.

Or else let an Unguent be made of Galbanum and Myrrh. But all things whatsoever that are moist, and that easily bring in a Putridness, they are all of them to be avoided, and no use made of them. And there are also certain internal Medicaments to be administred; as the Root of Birthwort, Gentian, Ellecampane, Centaury the less, Ammoniacum with Honey.

But if after Contusion or Contorsion (by reason of the conflux of the thick Humors) there remain a hardness in the Nerve or Tendon, and that thereupon a Numness and stupidity be excited in the part, then Emollients and Digestives are to be laid on; such as are, the Root of Marsh-mallows, of white Lillies, Bdellium, Ammoniacum, Galbanum, and the great Diachylon.

And Lastly, If the Ligaments be bruised, and writhed out of their places, then there are to be laid on those Medicaments that have in them a virtue and faculty of heating, discussing, and strengthing the heat of the part; and such are the Oyl of Mastick, Spikenard, Orrace, Spike, the Emplastrum Barbarum, and the black Emplaster. *Or,*

Take *Oyl of Mastick, Spicknard, Spike, of each one ounce; Bdellium, two drams; Saffron, one scruple; Wax as much as will suffice, and make an Unguent.*

Chap. 19. *Of Wounds caused by the biting of Living Creatures.*

UNto Wounds with a Contusion there belong likewise even those that are caused by the biting of Living Creatures, and Bullets shot from Guns; touching which our purpose is therefore to treat in special, and particularly. And in the first place, as concerning Wounds that are made by the biting of Living Creatures, we intend to treat of them here in this Chapt. as they are void of Poyson: and of the biting of Poysonous Creatures our purpose is to speak afterward, in the 21. Chapter. For it somtimes so happeneth that a man may be bitten by a Dog, Ape, Horse, Ass, or other Creatures that are not poysonous or mad; or else one man may be bitten by another. But *Cornelius Celsus* (in his 5. *B.* and 27. *Chap.*) writeth, that all bitings whatsoever of wilde Beasts have in them a certain kinde of Poyson: which indeed cannot well be denyed of wilde Creatures. For since that the very spittle of living Creatures hath in it a great power and virtue, (in so much that if there be any thing vitious in the Body it easily drinketh it up)

this spittle may together with the biting easily be conveyed into the Wound. And this must likewise be remembred, that these Animalls when they bite, they are for the most part enraged. And then it being true, (as it is generally wel known) that wrath and rage have in them a great power both of causing a commotion in the humors, as also of corrupting them; that vitiousnes of the humors is very eatily communicated unto the spittle, and by it may as easily be imparted unto the Wound: and this happeneth much the rather, if so be the Man be Frantick. And if there were altogether nothing of virulency in the Wound that is inflicted by the biting of one of these living creatures; yet notwithstanding the very contusion itself (which rendereth all wounds whatsoever the more dangerous, and the more difficult to be cured maketh those wounds the more grievous. For since that the teeth of the said Animals are not so sharp as a sword, or some other kind of Weapon; while they wound, they do withal likewise bruise, and cause a Contusion in the part they fasten upon.

Prognosticks.

But now how dangerous these wounds also may be that are caused by one mans biting of another, *Guibelm. Fabricius* teacheth us by three Examples, and instances, that he giveth thus in his 2 *Century, Observat.* 84. and 85. The first whereof is of a certain Merchant who a midst his Cups by anothers biting was wounded in the very tip of the right forefinger; whose whole right hand upon the same biting became inflamed, and a *Gangrene* soon after began to follow, with Convulsions, an extreme burning feaver, a Syncope, and continual restlesnes.

The second instance is of a Physitian, who rashly and inconsideratly putting his finger into the mouth of a Phrantick woman, to the end he might feel her tongue, had it bitten by t his mad woman; and upon this biting he became extremly afflicted with a vehement pain, not only in the said finger, but in the whol Arm also. The last example is of a man that being by another furious and enraged person sorely bitten even unto the first Articulation of his Thumb, he likewise was instantly taken with a vehement pain al that Arm throughout, and soon after there followed a feaver, and a Syncope.

Matthias Glandorpius (in *Specul. Observat. Chirurgic. Observ.* 49.) relateth the like History of a certain person, who by another mans teeth (the man being much enraged) was wounded in his thumb, about the first Joynt; from whence there arose a most extreme pain, an Inflammation of the whol hand, a Continual fever, a restlesnes of the body, frequent faintings and swoundings, and a very intense pain of the head.

And evermore the wounds are dangerous, both in themselves, (by reason of the contusion) as also becaus that the spittle of the furious and enraged Animals hath somwhat of malignity Joyned with it; and they are so much the more dangerous, if any of the Nervous parts (such as are the fingers) shal chance to be bitten.

The Cure.

In regard that (as we have said) in every wound that is inflicted by the biting of any living Creature there is present a Contusion, and this somtimes greater, and somtimes less according as the teeth of those Creatures are more sharp (such as are the teeth of a Dog, Ape, and Squirrel) or else less sharp, (as those of a Man, Horse, Ass &c.) and that from this Contusion the pain is caused; therefore there ought a regard to be had both unto the Contusion and the pain.

And therefore in the first place, the blood is carefully to be pressed and squeezed forth of the wound; and opening of a vein, or purgation (according as need shal require) is to be instituted: and to prevent the greater afflux of the humors, and the Malady from being communicated unto the superiour parts some Defensive of Oxycrate, or some other the like, is to be imposed upon the superior part; but unto the Wound it self (for the asswaging of its pain, the promoting of the suppuration, and the keeping of the Wound open,) such a like Medicament as this that followeth is to be applyed.

Take *One Egge, butter half an ounce, Saffron one scruple, Oyl of Violets, and Roses of each two drams; and mingle them.* or,

Take *Marshmallow Roots, one ounce and half; the leaves of Mallows, flowers of Camomile, and Melilote, of each half a handful; Wormwood two pugils; boyl them to a softnes and let them be wel bruised and mashed together: when they are wel bruised add unto them the yelk of one Egge, oyl of Roses, and Camomil, of each as much wil suffice, and make a Cataplasm.*

If there be any fear that there is some kind of virulency in the Wound, then we may ad *Scordium*, as also *Treacle*; and therefore such an unguent is to be provided.

Take *The Basilick Unguent, and fresh butter, of each half an ounce, Treacle one dram; oyl of Roses one ounce, the yelk of one Egg, and mingle them.*

And moreover, that what is bruised may be wholly converted into *Pus* we are to use *Honey of Roses, Rosin Turpentine, with the yelk of an*

an Egge, or the Basilick Unguent, or if any Malignity be feared, this that followeth.

Take *Pouder of Myrrh, Root of Round Aristolochy, Orrace of Florence, and Aloes, of each one dram; Angelica, half a dram; Treacle dissolved in the spirit of Wine, two drams, with hony of Roses make a Liniment.*

And at length, the Wound being wel wiped and cleansed, it is to be filled up with flesh, and so shut up with a cicatrice, as in other cases is wont to be done.

If a *Gangrene* be feared, as nigh at hand, then the Cure is so to be ordered, as we sayd before, touching the *Gangrene*.

Glandorpius his father (in the case before alleadged) besides general and internal remedies, was wont to administer these Topicks.

First of all, with this Unguent he anoynted the filaments; and then he imposed them hot upon the Wound, with the *Citrine Emplaster*. As,

Take *Venice Turpentine often washed one ounce, the powder of Earthworms two scruples: Frankincense half a dram; the yelk of one Egge, and mingle them.*

The hand even unto the wrist was anoynted with the *Oyl of Roses*.

The pain increasing, he applyed warm this following Cataplasm.

Take *Scordium or Water Germander, the herb Sauce alone or Jack by the hedg, of each four pugills or smal handfuls; Wormwood, the tops of St. Johns wort, Sage, Marjoram, of each two pugills, Red Roses three pugils, flowers of Camomil and Melilote, of each one pugil; the pith of Rie bread three ounces: bran, one ounce; the meal of Lupines one ounce and half with a sufficient quantity of Wine make a Cataplasm; adding in the conclusion, oyl of Rue six drams; oyl of Roses with Earthworms, an ounce and half; the yelk of one Egge, Saffron one scruple; and mingle them.*

The pain yet for all this little or nothing remitting, about the hand wrist, and the Elbow, he applyed this Defensive.

Take *The Unguent of Roses Camphorated (or with Camphyre and the Santaline Oyl, or the oyl of Saunders, of each half an ounce; oyl of Roses with the Juice of Night-shade, three drams; Bole Armenick two drams, powder of red Roses one dram; Rose vinegar as much as wil suffice, and mingle them.*

The pain somwhat abating, there was then discovered a Nerve, or rather a black Tendon; and upon this he strewed the following powder.

Take *Roots of round Aristolochy, Sow fennel, Orrace of each one scruple; Harts horn burnt, prepared powder of Earthworms, and Frankincense, of each half a scruple, mingle them and make a very fine powder.*

Upon which he laid on the filaments after he had dipt them in the *Diapompholyx Emplaster*; and covered them with the *Emplaster Diapalma*: & so the fear that was conceived of the necessity of the cutting off of the Thumb, was taken away: and a great part of the Tendon cut forth; and the first little bone, being become altogether rotten was drawn forth with the Nayl. But because that the fingers (by reason of their being continually bound up,) as also the thumb, were benummed and wanted their motion, by fomentations, Bathes, and Liniments, the fingers recovered their motion again; and the thumb albeit that it remayned immoveable, yet nevertheless it had a new Nayl instead of the former.

Chap. 20. *Of the Wounds by Gun-shot.*

UNto Wounds with contusions we may likewise add those that are inflicted by Gunshot. Where at the very first, and before we proceed any further, this question cometh to be discussed; to wit,

Whether wounds that are inflicted by Gunshot have any Malignity in them; and whether they receive any burning heat, (causing an Inflammation, and putrefaction of the humors) from the powder, or the Bullet?

Three opinions touching wounds by Gun-shot.

And here in this Controversy, we find that Authors are altogether divided into three Ranks, and opinions. The first determine, that the Wounds inflicted by bullets from Guns are poysonous. Others deny indeed that they have any thing of poyson in them; yet they have nevertheless (as they say) an *Empyreuma*, and burning. But thirdly, and lastly, others there are that wil not admit of either of these; but they assert, that al that wherein these Wounds differ from those that are inflicted by a sharp weapon, is from the contusion and tearing of those parts the bullet passeth thorow. All which opinions we wil now examine in order.

The first opinion.

And first of al, the opinion of them that assert these wounds to be poysonous is indeed very Ancient; and therefore soon after the invention of Guns, according to this opinion, there was likewise a Method

propounded and practised, for the curing of Wounds inflicted by Gunshot. For *John de vigo* (in the second part of his *Pract. Chirurg.* Book 1. and the *Chapter of a poysonous wound*) writeth in this manner: If the Wound shal be caused by the Instrument now much used, and called *la Bombarda*, or (as we term it) the Gun; then there ought to be made a cauterization, with the oyl of *Elder*, or the oyl of *Linseed* only. And *Paræus* writeth (in his tenth Book of *Chirurgery*, *Apologism* 1.) that it was a thing much in use even in his time, to burn into such wounds with the oyl of Elder applyed very hot, and that had mingled with it a little Treacle; and that he himself also at the first followed this way and method of curing; until accidentally (by a certain chance) there was another way taught; touching which, see the place alleadged.

The reasons by which the first opinion is proved.

But those that follow this opinion prove this poysonousness (in the general) from the diseases and symptoms that usually happen there upon; such as are, the corruption of the parts, and the Gangrene, those ulcers resembling the Nature of the Tumor *Herpes*, the trembling of the Heart, Malignant fevers, the lips of the Wound leaden coloured, or black; and then next of al they prove it from the course that is taken in the Cure; because that it is found by experience, that *Alexipharmaca* (or Counterpoysons) have brought much benefit and help unto the Patient; and because that these Wounds are to be kept open a long time, after the manner of other poysoned Wounds. And lastly, some there are that pretend this likewise, that it hath been found, that all those have perished that in some certain battles have been wounded by such bullets; or if any have escaped, that it was very hardly; and that they were preserved by some extraordinary pains and labour; although that the Wounds did not seem so great and dangerous, whatever were the diligence and care of the Chirurgeons, and though it were never so little.

But others of this opinion wil have this poysonousness to proceed from the Gunpouder, by the force and violence whereof the bullets are driven forth; others from the matter and metal of which the bullets are made; others from the poyson wherewith these bullets are poysoned. For this powder consisteth of Brimstone, Nitre, and Coals: of which (they say) the two former are hot in themselves; and when they are fired, they then become extremely hot; and if they take flame, then do they at length acquire a poysonous quality, as these would perswade us. And this they think to be sufficiently manifest even by this also, because that those who make this powder shut both their mouth and their Nosethrills, that so they may not be hurt by the poysonous exhalations of this powder. But they who derive this poysonousness from the Metal, these tell us that al Metals in general are poysonous, and enemies unto our bodies: others although they say not that these bullets are in themselves poysonous; yet nevertheless they take upon them to prove that these bullets may be poysoned; and that this was much used by divers Nations, they abundantly prove out of several Authors; As, *Theophrastus*, in his *ninth Book of Plants*; *Chap.* 15. *Dioscorides* in his *sixth Book, and Chapt.* 20. *Pliny*, in his *twelfth Book, and Chapt.* 53. *Paulus Ægineta* in his *sixth Book and Chapt.* 88. and other modern Writers. And some there are who here (for to prove this their opinion) betake themselves to the likeness and resemblance of the lightening and blow of the Gun; and as it is most certain that oftentimes in Lightening there is a certain poysonous quality and power (as is sufficiently testifyed by the stench, and the wonderful power it hath of blasting and destroying both man and beast, and that in a moment; as also the other malignant Effects thereof sufficiently witness the truth hereof) so they conceive that there is something like unto it in the flash of the powder and the noyse or report of the Gun.

The Second opinion.

Secondly, Many there have been, and stil are, who affirm that an Empyreuma or Combustion of the parts is joyned with these Wounds. And hereupon it is, that Chirurgeons commonly carry about with them so many Medicaments, which our Chirurgeons term *Pulver le shung*, (that is, extinguishers of the Gunpouder, or the *Empyrema* when the parts are inflamed and burnt in these wounds by Gunshot) because, to wit, that they are perswaded, that in such wounds there is an *Empyreuma*, which is first of all to be extinguished. And this they endeavor to prove by these Reasons. First of al, because those bullets when they are cast forth may be inflamed by the Gunpouder, and so may contract an *Empyreuma*. Secondly, from the motion it self of the bullet, which in regard that it is most quick and swift, they conclude that the bullet is thereby made hot; the same that even *Aristotle* also hath taught us; who (in his second Book *de Cælo Chapt.* 7. *text* 42. and in his first Book of *Meteors*, *text*, 3.) writeth, that by a vehement motion the Iron is made hot,

The Reasons for proofe of the second opinion.

hot, and the Arrow heads melted, and wood and stones set on fire: which we are likewise taught by Experience it self, it being very wel known, that by the hard and vehement rubbing of wood one piece against another the Country people do sometimes raise a fire; and that the Axletrees of Mil-wheels, unless they be often moystened with fat, are very apt to be inflamed and set on fire. And thirdly also, the very same is by experience confirmed in these bullets; since that oftentimes it hath been found, that (in villages) the straw or thatched houses have by these bullets been set on fire; and that whole houses have been burnt down thereby. Fourthly, they say also that other things that are wont to happen in combustions or burnings, do appear likewise in those Wounds; to wit, that the wound it self becometh black, that there flow forth from thence sharp, stinking and black Ichores (or thin Excrements) and that the inflammation (as it is wont to be in all combustions or burnings) is augmented even untill the Ninth day, and then after this diminished.

The third Opinion.

Reasons for the defence thereof.

1. That there doth not proceed any poyson from the Gun-pouder.

And thirdly, those that deny that there is present in these Wounds any poyson or burning they urge these Reasons for their opinion. And indeed in the first place, they in this manner fight, and oppose themselves against this poysoning of the Wounds. First of al (say they) if there be any poyson in such Wounds as are inflicted by gun-shot, it is brought in and caused either from the Gun-pouder, or else from the bullet. That it proceedeth not from the Gun-powder, appeareth from hence, that those things of which it is compounded are not poysonous: for it is made of Brimstone, Nitre and Coals: of all which not one of them is poysonous. For both the Sulphur, and the Nitre, are made use of in the stead of internal Medicaments, both by the Ancient, and by the Modern Physitians also; and this is a thing so generally wel known, that it needeth not any proof at all. And much less have these Coals any thing of poyson in them. And although that this powder shal be kindled, yet notwithstanding it cannot from thence acquire any poysonousness, since that fire doth rather consume then produce venenosity or poysonousness. And that this powder is not poysonous, there are many Soldiers that have sufficiently proved; who have made great use of it (together with vinegar) for the Curing of the Plague: and they use to burn it in houses, in time of a great plague to drive it away, and to preserve themselves from the contagion thereof. Yea, the affect it self, and experience do sufficiently prove this, which testify, that very many who have been wounded by these bullets have yet notwithstanding suffered no symptom at all, that in the least might betoken any thing of poyson.

2. Not from the Bullet.

Neither also can this poyson come from the leaden bullet. For it is most manifest, that the bullet of lead (especially if it be whole) cannot possibly bring any poyson along with it; and it appeareth even from this, that many carry about in their bodies such bullets that have been shot into them, sometimes for the space of many years, and this without any hurt or damage at al. Yea some have swallowed bullets of lead, and cast them forth again by the belly, without any the least hurt. And it is a thing very wel known, that Lead, and such various Medicaments as have from it been made, have been by the Ancients and our selves very successfully administred unto the External parts, for the curing of old Ulcers. But now that such bullets may indeed be poysoned (as we shall afterwards shew you) this they deny not: but this happeneth not unto al such wounds; as we shall anon further shew you.

That there is present no burning, how proved.

And that there is also no burning present in the Wound they thus prove it. For first of all if these Wounds should bring in any burning at all, then the bullets themselves ought to be fired, and thereupon melted; whereas notwithstanding, we see that the bullets are taken whol out of Wounds, and appear to have suffered no such thing. Secondly, this burning should rather be perceived in those things that are more combustible; and this burning should first of all appear especially in the Clothes of those that are in this manner wounded: whereas notwithstanding, there is not the least appearance or shew of any burning in these Garments, whether Linen or Woollen: yea and those who endeavor to defend ships and houses from the violence and blows of these bullets, what do they? Do they not hang before them Sacks filled ful of Wooll or hurds? Which were yet never known to be set on fire by these bullets, no not by the greatest of them. Neither may any one here object, and say that there is great difference between the parts of mans body, and Garments, and such like things. For such things as these (by reason of the widness of their passages,) may be pierced thorow by this most thin Exhalation, without touching or hurting the substance: which yet may hurt

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a mans Body, by reason of the closeness and compactedness thereof: and that the same happeneth here which is wont in the lightening that oftentimes melteth the Sword, without hurting the Scabbard.

But there is here a very vast difference between the Lightening and a Bullet. For the whole Action of the Lightening is by a most powerful Spirit; and by a most subtile substance that pierceth through all things whatsoever: but it is not yet proved, that there is Joyned with the Leaden Bullet any such spirit; but here the whole Action is of the Bullet it self, which neither burneth things that are thin and permeable, nor yet Wood, (and other things of a thick substance) upon which it not only glanceth, but directly striketh against. Thirdly, since that there is hardly any thing to be named that is more inflamable then the Gun-pouder; if these bullets should burn the Body of Man, it should much more kindle and set on Fire the Gun-pouder; which yet nevertheless it doth not do; experience it self testifying, and teaching us, that although a Vessel that is ful of such Gun-pouder shall be shot through by such a bullet, yet that the said Gun-pouder is not hereby kindled and set on Fire. But if at any time it so chance that by a Bullet sent out of a Gun the Gun-pouder be fired, this happeneth because that either the flame it self penetrateth unto the Pouder; or else that the Bullet striking against Iron, or some Stone, is kindled by the sparks of Fire, just as we see it to be in the striking together of the Steel and the Flint-stone. Fourthly, if instead of the Leaden bullet, either Papper pellets or pellets of Hurds be ram'd into the Gun, and then shot forth, there will not appear any the least tokens of any burning in them (caused either by the Gun-pouder, or else from the vehemency of motion;) but only, that sometimes they are sullied by the Gun-pouder, and made a little black; and they are oftentimes drawn forth of the very Wounds as whole and entire as they went in. Fifthly, Those who are thus wounded do not feel any heat or burning from these bullets, but only a pain from the bruising and tearing of the flesh. Sixthly, That those bullets are not made hot either by the flame of the Gun-pouder, or else by the swiftness of their motion, we are sufficiently assured of it even by this, that a bullet made of Wax, and shot forth of a Gun, doth not at all melt, but that it even pierceth through a two inch board, or any piece of Wood two Fingers thick. And from this alone it may appear very manifest that those bullets, whatsoever it be that they do, it is not by the power and virtue of any Fire that they have in them; but what they effect, is meerly by their force, and violence.

The Decision of all the opinions.

But now that I may a little open unto you my thoughts, and give my Judgment touching this Controversie; I conceive the third Opinion (well weighing the Reasons that are brought for it) to be the most agreeable to truth. But those Arguments that are brought for the two former Opinions may easily be answered. For the first of the three, who defend, that those Wounds are poysonous, they do not prove it by this, that first of all grievous and dangerous Symptoms do infest those that are wounded in this manner. For all those Symptoms may possibly proceed from a Contusion if it be not rightly Cured, or if it be overgreat, and that there be from hence a putridness excited. For when that bullet doth with the greatest violence that may be penetrate through those parts against which it hitteth, it dasheth together all whatsoever lieth in its way, bruiseth, and teareth it; by which said violence not only the Capillary Veins, and the Arteries and Nerves, (that be every where up and down dispersed throughout the flesh) are rent and torn; but the greater Vessels likewise are battered and broken; insomuch that the Natural flux of the Blood and the Spirits is hereby hindered; whereupon the bruised parts being deprived of their Natural and Vital heat are easily corrupted, and soon putrifie. Neither can it truly be said, that the trembling of the Heart, and the like Symptoms do happen unto all that are thus wounded. But as for what they say in the second place, that *Alexipharmaca* (or Counter-poysons) have been sometimes found very good and commodious for the person thus wounded; we answer, that this is not true of all Wounds made by Gun-shot; but of those only, when by the Contusion, and the great putridness following thereupon, and the neer approaching of a Gangrene, the Heart is hurt by the putrid Vapors, ascending from the Wound through the Arteries; and thereupon it is by Alexipharmick and Cordial Medicaments to be defended from them, and withal strengthened. But, that those Wounds are a long time to be kept open, this is not therefore to be done, that so the poyson may be evacuated; but that the *Pus* that is continually generated from the bruised parts may be emptied forth, which is done too slowly, in regard that in such Wounds as these there is very much of that that is bruised. And Lastly, for what they alleadg, that in many battles the most of those that have been wounded, either they have Died, or else they have been preserved with very great pains and much difficulty;

this;

this did not therefore happen, because that the Wounds inflicted by Gun-shot were poysonous; (since that in very many other battles no such thing hath been observed,) but it happened from hence, to wit, either by reason of the bad and unhealthful Constitution of the Air; or else from the vitious and unsound Constitution of the Body, and the great store of depraved Humors in these wounded persons; such as is most commonly wont to be in those that follow the Camp.

But now in special, and particularly, the poysonousness of those Wounds cannot be proved to arise either from the Gun-pouder, or from the bullet. For (as we also told you before) neither is the Sulphur, nor the Nitre, nor yet the Coals, all or any one of them poysonous; and therefore surely of these there can nothing be compounded that is poysonous. And that Sulphur and Nitre may be safely administred, appeareth out of *Dioscorides* his 5. *B.* and 83. *Ch.* and out of *Hippocrates*, in his *B. of the Nature of Women*; and others, both Ancient and Modern. Now the kindling and inflaming of these, and the Fire following thereupon, would rather dissipate this poyson (if any such were present) then any waies produce it. Neither do those that make this pouder stop their Mouths and Nosethrils, by reason of any poysonous quality that it hath, but to keep out the pouder, that is otherwise very troublesom when it gets into the Mouth or Nosethrils: neither yet do all that make pouder stop the aforesaid places, although some do for the reason I have given you.

And moreover, much less can this poysonousness be produced from the Lead. For although it being long deteined in the Body, and there resolved, like unto other Metals, (if it contract any rustiness) it may possibly do hurt: but yet nevertheless, that in this its moment any passage through the Body there should be any poyson imprinted by it upon the Body, this can no way be. And (as we told you above) these bullets have sometimes been known to lie in the Body for many yeers together, without any inconvenience or hurt: yea and moreover, from lead there are many very useful Medicaments to be made, for External Ulcers.

But this we easily (and of our own accord) yield unto, and readily grant them; that those Bullets, as also all other Weapons, may be infected with poyson. For although the Lead be thick enough, yet nevertheless, since that Iron that is yet far more solid may be infected with Poyson, why may not Lead also be poysoned? Now that Iron may be infected with poyson, there is no doubt at all to be made; the truth whereof is sufficiently testifyed by the Histories (both Ancient and Modern) of those Nations that as yet use Arrows. And this we are assured of by *Dioscorides* (in his *sixth Book*, and 21. *Chapt.*) and by *Paulus Ægineta*, (in his *sixth B.* and 88. *Chap.*) and by *Virgil*, (in the *tenth B.* of his *Æneids*, and elsewhere) as also by *Ovid* in his 3. *B. de Tristibus*. And of this there is no question at all to be made. But here lieth the question, whether or no every Wound inflicted by the bullet out of a Gun be poysoned; and this I deny. And therefore, like as we cannot truly conclude, that because that Wound which is inflicted by a poysoned Sword is poysoned, therefore that all Wounds inflicted by the Sword are mortal: so also we can no more rightly and truly conclude thus, if there be some certain Wounds made by Gun shot, that are poysoned, therefore they are all such. Neither is there any reason, why any one (with *Paræus* in his 10. *B. Apologism* 2.) should think, that there is in Fire power enough (and more then enough) to dissipate all the strength of the poyson, if any should chance to be poured upon the bullet. For (as we shall afterwards prove) and as even *Paræus* himself granteth, those bullets out of Guns can by no means get any such great heat, as that thereby (like as by Fire) the poyson (if any such there be present) may be dissipated and consumed.

But now, in what manner these bullets may be infected, whether only by being anoynted, (as *Paræus* is of opinion) or else by an infusion of the very poysoned substance it self (which he denieth) of this I dispute not. And yet nevertheless, I do not think it a thing altogether impossible, that some poysoned substance (if not vegetable, yet Mineral) may be given, which by infusion may be mingled together with the Lead, and there remain. But I shall not contend at all in the maintaining of this my Opinion, neither shall I take much pains to discover whether there be any such, yea, or no.

And whereas they would by the instance they give of the Lightening prove their opinion; we answer that there is not so great a resemblance between the Lightening and the Report or blow of a Gun, as they think. For indeed that there is oftentimes in Lightening a certain kinde of poysonousness, it cannot be denied. But in the blow or Noise of a Gun there is no sugh thing, as we have before already proved out of its Composition. Neither doth any flame from the kindled pouder penetrate unto the Wound it self; but whatsoever the bullet doth it performeth

by

by its violence and motion, after the manner of other things that are cast forth with violence, as Arrows, and Stones cast forth of slings. But now, for what reason things thus cast forth by a violent and vehement motion should work such effects, here is no fit place for me to dispute. And if there be any resemblance at all between the Lightening and Guns, this likeness is rather in the Fire from the Gun-pouder being kindled and cast forth, then in the Leaden bullets.

And Lastly, Their telling of us that in some certain battles such as have been wounded by these kind of Bullets they have most of them died of their Wounds, neither doth this prove the poysonousness of these Wounds. For neither doth this happen in all battles, (as we likewise told you before) but very many have been Cured and recovered of the most dangerous and desperate Wounds. And this if it shall somtimes happen, it is to be ascribed either unto the Malice of the enemy, infecting these bullets with poyson, or else to the ill disposition of the wounded bodies, or lastly, even unto the vitious Air it self. For it is a thing well known, that the Bodies of Souldiers (by reason of that ill course of Dyet they keep) are very much disposed unto the Plague, and other Diseases: in whom Wounds, if any happen unto them, may easily prove Mortal; like as the Wounds of Hydropick and other Cacochymical persons are wont to be very dangerous. And there is likewise no doubt to be made, but that the Air becoming impure and corrupt, both by the unseasonableness of the weather, the Crazy Constitution of the yeer, and the impurities, and nastiness that alwaies followeth the Camp, may cause the wounds to be the more dangerous. And evermore in such like Wounds the ill disposition of the Bodies, and the Vitious Constitution of the Air, bring more danger unto the party, then in other Wounds inflicted and made without any bullet. For in these latter there is no such great need of suppuration; but in those other Wounds that are not made without much bruising, there is altogether great need of Suppuration, and Suppurating Medicaments. Neither without these can such Wounds by bruising be any waies Cured; which said wounds in Bodies that are ill disposed do very easily get a putridness; which the feavers that follow, and the bad Symptoms are easily able to excite. Neither indeed is this any new kind of wound. For although that the invention of Guns, and this casting forth of the Leaden bullets be new; yet the manner of the wound is not at all new, (as being wel known both unto *Hippocrates* and *Galen*) to wit, Contusion, or bruising. And yet nevertheless our expert Chirurgeons do not rest themselves in the alone use of Suppuratives, but if there be any fear of a putridness nigh at hand, which may very easily produce a Gangrene, they then use the *Ægyptiack Unguent*, and other Medicaments that may prevent and keep off the Gangrene; as we shall anon have occasion to speak further hereof, when we come to shew you the Cure; which yet notwithstanding ought so to be ordered and contrived, that they may not altogether hinder the suppuration; since that no wound made with Contusion or bruising can possibly be healed, unless that which is bruised be converted into *Pus*.

Now as for that other Opinion of those who assert that there is a burning or *Empyreuma* conjoyned with these wounds, neither have these any firm Reasons to ground their opinion upon. For that our German Physitians and Chirurgeons call these their Medicaments that are in these wounds at the very first administred, *Pulver le schung*, that is, Extinguishers of the *Empyreuma* or burning that happeneth from the Gun-pouder; this is grounded upon a false supposition; for they who at first gave this appellation unto these Medicaments did falsely beleeve, that there was an *Empyreuma* joyned with these wounds, and that this *Empyreuma* or burning was first of all to be extinguished. But now all those Medicaments perform nothing else, but that they either turn into *Pus* all that in the wound that is bruised, and to hinder and prevent putridness; or else they keep off, and turn away the inflammation, if there be any nigh at hand. Now that these suppurating Medicaments differ somwhat from those suppurations that are wont to be administred in other Wounds and Ulcers, there is no wonder in this: For above, (in the *first Part*, and 16. *Chapt.* and likewise a little before, in the 18 *Chap.* of this *fourth Part*, *touching a Wound with Contusion*) we told you that in Contusions those hot and moist suppuratives have no place at all, but that from the use of them a putridness and oftentimes also a Gangrene is thereupon excited; and that therefore those Medicaments that were more drying, and such as resist putridness (provided, that in the mean time they likewise strengthen Nature in her generating of *Pus*) are necessarily required.

But now the Reasons they alleadg for this their Opinion have in them very little of solidity. For first, whereas they assert that those bullets are as it were fired by the Gun-pouder when it is kindled, this is false; and above by those Arguments we brought for the third Opinion, it was sufficiently proved, that

that those bullets are no waies heated and set on Fire by the said Gun-pouder. And then furthermore, whereas they think that those bullets are made hot by their violent and swift motion, (and to prove this, they Cite *Aristotle*, as a witness on their side; for *Aristotle* indeed, in the *place before alleadged*, writeth, that motion is wont to set on Fire both Wood and Stones, and even Iron it self; and this he confirmeth by experience;) unto this we thus reply; that this may be done, there is a necessity that there be two hard and solid bodies long rubbed hard one against the other. But that Lead, or any other Metal, should by their motion through the Air become very hot, and that it should hereby be set on Fire, this was never yet taught us by experience. For if this were done, then Arrows also (that oftentimes are pointed with Iron or Brass points, we call them Arrow Heads) being shot through the Air ought to become hot, and likewise to be fired. But now, as for what they say in the third place, to wit, that by these bullets thatched Cottages and other Houses have been set on Fire; this we grant to be true, if any flame (which together with the bullet is sent forth of the Gun) touch the House; or if there be any kinde of Fewel, or Combustible matter fit to feed the Fire, tied and fastened unto the bullet, as Incendiaries are wont to do. But if it be from that flame, or from fiery matter: and if the bullet only touch the straw, neither it, as neither Wooll, nor Hurds, nor Gun-pouder it self can be kindled; as before we told you in the Arguments that were brought for the third Opinion.

Neither is there any place here for that distinction of *Quercetan*, (which he hath in his *Sclopetarius* or Gunner) where he writeth that if that bullet be sent forth of the Gun at a distance, and a great way off, or else that it hit any part that is covered with Clothes, that then the Wound is without an Empyreuma or burning: but if the Wound be inflicted by such a bullet out of a Gun nigh at hand, or if it light upon a part of the Body that is naked and bare, that then the Wound may have Joyned with it a heat and burning. For although that the flame from the kindled Gun-pouder, breaking forth of the Gun, may neer at hand hurt the beard, and the Hairs of the Head, or likewise the Clothes; yet notwithstanding it is altogether a thing incredible, that the flame by that smal Wound of the Skin (through which the bullet penetrateth into the Body) should together with the bullet break in, and pierce so far into the Body. Neither doth there appear any difference between Wounds made by bullets, whether a far off, or night at hand, but only this, that the Contusion is greater and more grievous that is caused by a bullet shot forth nigh at hand (in regard that it strikes with a greater violence) then the Contusion or bruise that cometh from that bullet that is shot at a great distance, and striketh more weakly. But Fourthly, As for what concerneth the Symptoms that appear in these Wounds; we answer, that all these do not proceed from any *Empyreuma* or burning, but from the Contusion; and they appear also in those other Wounds in which there is present no *Empyreuma*, nor burning, at all. And that at length about the ninth day the wound appeareth to be in a better condition, and what is corrupted begins to be separated; this happeneth not only in Wounds with burnings, and where there is an Eschar; but also in Contusions; since that a certain space of time there ought to be, wherein that which is battered and bruised and corrupted be turned and converted into *Pus*. Neither is that to be accounted for any true Eschar, that these men take for an Eschar in these kinds of Wounds; being that it is no waies hard, as an Eschar is; but flesh greatly bruised, which forthwith dieth; whereupon it likewise becometh black; and yet nevertheless, it is somtimes likewise discoloured, and made black by the heat of that Gun-pouder with which the bullet it foul'd and sullied.

The Nature of Wounds inflicted by Gun-shot.

By al which it may sufficiently appear, what the Nature of these Wounds is; to wit, that it is only with some notable Contusion and tearing of those parts through which the bullet passeth. And although the part may close at Hand, and at a neer distance, be burnt by the flame of the inflamed Gun-pouder, yet this appertaineth not unto the Wound it self; neither is the part burnt within. And we likewise grant that these bullets may possibly be infected by poyson; but this is no way essential unto these wounds but a thing meerly accidental: like as, if any one shal be wounded by a poysoned Sword, this poysoning is no way of the essence of the Wound.

But that which hath deceived all those of this Opinion, is this, that other Symptoms happen unto these wounds, and that these wounds require another kind of Cure then those Wounds that are caused by Arrows. But these ought better to have considered, that there is a very great difference between those wounds. For Arrows are sharp, and they make a wound by Cutting; but those bullets are round and blunt, and therefore they hurt by breaking and bruising; upon which there easily follow a Corruption

of the bruised part, and very ill Symptoms.

The Differences.

The Differences of these Wounds are taken. 1. From the greatness of the Wound; to wit, that some are great, some but smal, some superficial, others more deep. 2. From the part affected; that somtimes only the Flesh and the Skin are wounded, but somtimes the Nerves and Tendons, Yea and the greater Vessels are broken, Yea and the very bones likewise are broken and shattered. 3. Another Difference is from the manner, that a Man is somtimes wounded only in one part; and somtimes the whole Body, or some one part thereof is wholly shot through: and somtimes also the bullet passeth quite through the part, and then at other times it sticketh yet stil in the part: and somtimes only the bullet penetrateth into the Body; but somtimes again it carrieth along with it into the Body some of the weapon, or some thing else through which it passeth.

Signs Diagnostick.

There is no need that I declare unto you those signs by which these wounds in general are known; seeing it will be sufficient to know that the party was wounded with a bullet shot forth of a Gun. But now what parts they are that are Wounded, this is to be discovered either by putting in the Probe; or else it may be known from the very Scituation of the parts, with the which Anatomy will acquaint us. If the Nervous parts chance to be hurt, this the pain will manifest. But whether or no the wound be poysoned, this is known by the Symptoms following thereupon; to wit, if the colour of the flesh be more Wan and Leaden-coloured then it was wont to be; if there likewise happen an extraordinary heavines and sluggishnes of the whole Body; if there be a trembling and palpitation of the heart, Faintings and Swoundings, and other such like Symptoms as these, and that there be no other Cause appearing from which such Symptoms might proceed. Which notwithstanding even the very consideration of the bullet (if it be there present) wil sufficiently teach us. For if the bullet differ from all the other things in colour, or in any thing else, there is then great cause to suspect its being infected with poyson: and this is confirmed, if the bullet being put into a hot fire, we take good notice whether or no there exhale from it any thing that is black and stinking, or else whether the bullet it self being again cooled, there stick any thing unto the outside of it, and change its colour

It is known that such a Wound as this will degenerate and turn into a Gangrene, by the slow Maturation and generating of the *Pus*; by the extinguishment of the fresh and flourishing colour of the part, and its inclining unto a yellow, and Leaden colour; by the remitting of the pain without any apparent cause, and by the ceasing of the beating, and by the stupidity of the part, and by other like signs of the Gangrene, such as we have above shewn unto you, in the *second Part*, and 19. *Chapter*.

Prognosticks.

But now, that we may not here again repeat those Prognosticks which they have in common with other Wounds, and which we have declared unto you above, in the *third Chapter*.

1. All those Wounds, since that they have Joyned with them an extraordinary and notable Contusion, they are therefore far more dangerous then those Wounds that are inflicted with a Sword or Darr. And therefore (as we may observe) of these Wounds made with the Sword, (as to instance, the Wounds inflicted on the Belly, Guts, and Bladder) many have been recovered; but it is a very rare thing for any to be cured of those Wounds that are inflicted by Gun-shot.

2. But although that those Wounds be far more dangerous then the wounds that are inflicted by the Sword; yet notwithstanding we must not rashly forsake the Patient, and give the Cure over; seeing that even here Nature is likewise wont oftentimes to work miracles as it were; and it hath been observed that very many of those that seemd to have been neer unto the Grave, have yet nevertheless recovered, and done well: and Histories to this purpose we very frequently meet withal, and they are well known: and *Guilhelmus Fabricius* giveth us likewise a very notable Observation, and a singular way of Curing these kinde of Wounds; as we may finde it in the *third B.* of his *Observations*.

3. If there be many (and those the more noble parts) that are wounded, bruised, and torn; and especially if withal the Bones be any of them broken and impaired, the Wound is then so much the more dangerous, and the more difficult to Cure.

4. And hitherto are to be referred those parts that can easily draw the principal parts into a consent with them; such as are the Joynts, as also the great Vessels wounded; from which there arise not only Vapors, but likewise vitious and corrupt Humors; which being received and communicated unto the Heart do easily excite both Feavers, and Faintings,

faintings; and the *Syncope*, yea and also the Fluxes *Diarrhæa*. And this *Ambrose Parry* observed in Count *Mansfield*, who (as this Author relateth in his *tenth B.* and 12. *Chap.* and in his 16. *B.* and 49. *Chap.*) having received a Wound in his left Arm, out of it Nature sent forth by the Belly a Purulent and stinking *Sanies* or thin Excrement. Yea and in other Wounds also it sometimes happeneth, that both Blood and *Sanies* is emptied forth by siege, (that is, by the Belly,) and likewise by the Bladder; like as *Ambrose Parry* hath an instance and example of this thing, in the *alleadged* 16. *B.* and 49. *Chapter*. As I have also given you the like example in the *second B.* of our *Practise*, *Part* 2. *Chap.* 16. *Quest.* 5. where I likewise treated of the way by which this may be done.

5. If such Wounds befal a Cacochymical Body, they are much more dangerous then if they happen unto a sound Body: from whence it is, that in Armies (in which Epidemical Diseases are wont to reign and rage) most of those that are thus wounded die of their Wounds. Yea and otherwise also in Camps those Wounds are dangerous, and become more difficult to Cure; in regard that the Air is for the most part infected with the Nastiness and Defilements of the Camp; and that Souldiers (for want of better food, and fit wholesom drink) for the most part use a very bad and corrupt Course of Diet; eating any meats whatsoever that come next to hand, and drinking filthy and corrupt waters.

6. Those wounds wherein the bones are broken are far more dangerous, and difficult to Cure, then those without this Fracture of the bones.

7. These kind of wounds if they be inflicted by a poysoned bullet, they are indeed then greatly dangerous, and for the most part Mortal, and more especially if they penetrate unto the interior parts. And yet oftentimes notwithstanding those wounds that are but smal to see to do yet kill and destroy the Patient.

The Cure.

These kind of Wounds have especially three indications. The First is this, the drawing forth of the bullet, if it as yet stick in the part; The Second is, the converting of the battered and bruised flesh into *Pus*; and the Third is that in common with al other Wounds, to wit, that the Wound be filled up with flesh, and then at length shut up with a Cicatrice.

Of the drawing forth of the Bullets.

And First of all therefore the Bullets are to be drawn forth of the Wound; and this is to be done either at the very first dressing; or if it be not then fit to be done, or that it cannot then be done; we are then to do it at some other time during the Cure. Now the bullets are wont to be drawn forth the same way they went in, and likewise that way whither they tend: for if the bullet shall penetrate very deep, so that it be found to be neerer unto the opposite part, and that through the Skin and the Flesh lying underneath it may be felt; then the part being opened by an incision, the bullet is by it to be drawn forth. But if the bullet shall not pierce so deep that it may conveniently be drawn forth on the opposite part; then the searching Instrument being put into the Wound that way the bullet went in, the bullet is to be sought for, and it being found, we must then attempt to draw it forth by a fit Instrument; which are various, and very different in their length and breadth.

Now there are these three things required in this extraction or drawing forth of the bullet. The First is, that the way be sufficiently opened by the Instrument. And then Secondly, that the bullet be laid hold on. Now the Instrument taketh hold of the bullet, either as a pair of Cizers, or else as it fasteneth it self (in its extream part, or point) into the bullet; either when it comprehendeth it within its Cavity; or else when it layeth hold thereon by its extream part, made like unto a Saw. And from hence there springs a great variety of Instruments; of the which some lay hold on the bullet, and draw it forth as they are fastened into the bullet: and others of them Comprehend the bullets, as they are broader and hollow at the end; and others, as they are in their extream parts notcht and made like unto Saws; of which some are straight, and others somwhat Crooked, according as the Wound is in its progress either straight or oblique. And Thirdly, the Bullet being laid hold on by the Instrument it is by the Chirurgeons hand together with the Instrument to be drawn forth. The Instruments that are fit for this purpose we may find extant in *Paræus* his *tenth B.* and 14. *Chapt.* in *John Andræas a Cruce*, and *Guilhelm. Fabricius*, in his 1. *Cent. Observat.* 88. where he sheweth us a very easie way of drawing out these bullets with Instruments there described and delineated; and by a new invention of his own he maketh that known common Instrument in the form of a Wimblet, more apt and fit (then it was before) for the drawing forth of these Leaden bullets. For whereas if the Common Wimble be fastened in the Bullet, the said bullet may easily be stirred

and turn'd about together with the Wimble: which to prevent, he first of all puts down (very gently) a pipe of Silver, or Iron, or Brass, polished and made as smooth as possibly may be, and then anoynted with the Oyl of Roses; and this he thrusteth down even as far as the bullet. And then after this he conveyeth in another pipe or little Cane, at the one end toothed, or like unto a Saw; and so indeed, that the teeth thereof pass from the left unto the right, and that they may hinder the bullets being turned about when the Wimble is fastened in it. And then at length by this Second pipe the Wimble is let down; and when it shall be found to be sufficiently fixed in the bullet, then the Wimble with the Bullet (and both the pipes) is to be drawn forth. But if the bullet cannot be found out by the probe or searching instrument (as it happeneth now and then in wounds when they are very deep) then the Wound is a long time to be kept open, and suppurating Medicaments to be made use of; and the Member is so to be placed, that the bullet may fall forth of it by its own weight. And so sometimes we have known it, that Weapons or bullets that have layn hid for a while in the body, they have at length (in the progress of time) either been drawn forth by the help of Art, or else they have been expelled by Nature. Unto Nature therefore (if the bullet cannot be found out) the whol business is to be committed; and the same is likewise to be done, if there be any danger at all in the drawing of it forth; and the rather, in regard that leaden bullets may lie long, and be carried about in the body, without any hurt or detriment at all unto the Wounded party; which cannot be said touching Iron or Brass bullets, which because that they contract a Rustiness, they will not suffer the Wound to be healed.

But yet nevertheless, if the bullet stick fast in any Noble parts or that part that may easily draw the Noble part into a Consent with it, and that by reason of the Wound in it self the Patients life seem to be much endangered; the Chirurgeon ought not in this Case so much as to attempt the drawing forth of the bullet, since that by this means he cannot bring any help at al unto the wounded person, but may very easily hasten on that death, which the wound of it self would have brought upon the Party.

But then it is not the Bullets alone that are to be taken forth; but because that by means of these oftentimes the spills or splinters of Wood, Paper, fragments and pieces of Arms, and Garments, and other things of this nature, are violently carried into the wounds; al these therefore are in the first place to be drawn forth, & indeed this extraction is most fitly put in practise in the very beginning, and so soon as ever the Wound is made, in regard that the pain is as yet but little, & so likewise the inflammation is not so great as afterwards. But yet nevertheless, if such things as these cannot be drawn forth at the first dressing of the Wound; this is then to be done in the following dressings.

Of those Medicaments that are necessary for the Wounds inflicted by Gunshot.

And indeed, it may likewise verry wel be, that in these wounds there may be need both of venesection and purgation. But since that neither of these is proper unto the Wounds we are now treating of, but common unto them with other wounds, those things that we spake before on this subject touching wounds in general, may likewise here take place.

And therefore our first and main care must be, that what is bruised may be turned into *Pus*, and that it may be separated from the found flesh and the found parts. But in regard that the bruised parts may easily receive and gain a putridness, and that there may be great danger of a Gangrene nigh at hand, those ordinary and common digestive and suppurating Medicaments that are made use of in other tumors and wounds, here simply have no place; especially if any of the Nervous parts chance to be bruised; which cannot wel bear nor admit of such kind of moyst and simply Oyly and fat Medicaments, and require those that are dryer; but such are to be made use of that do in very deed make for the turning of the bruised flesh into *Pus*, and yet not produce any putridness. Which Medicaments have withall a virtue likewise to mitigate and moderate the pain. *Quercetan* (in his *Sclopetarius*) that he might the better prevent al those inconveniences that are wont to proceed from the use of common suppuratives, unto every ounce of these Suppuratives or Digestives he addeth one dram of precipitate Mercury. But I conceive that great caution is to be had in thus doing; and that nothing is to be done rashly. For though where there is present a putridness, and fear of a Gangrene nigh at hand, I do not at al dissuade the admixture of the said precipitate Mercury; yet nevertheless I say, that in all wounds whatsoever inflicted by Gunshot this is not either Necessary, or alwaies safe, since that experience testifieth, that many such wounds have been cured without the admix-

ture

ture of Mercury; and there are many other Medicaments more safe, that may prevent and keep off this putridness. And if the Nervous places chance to be wounded, this *Precipitate Mercury* may very easily occasion an extraordinary great pain.

Ambrose Parry received (as a great secret) this following Liniment, or Ballam, from a certain Chirurgeon, Famous by reason of that happy and succesful way he had of Curing these Wounds by Gun-shot.

Take *Oyl of white Lillies, or violets, four ounces; in these Oyls let two young Whelps (as young as you can get them) be boyled, until their very bones be dissolved: after this add of earth-worms washed in Wine, one pound; Boyl them together, and let them be strained without any strong expression; and unto the straining add of Venice Turpentine three ounces; Spirit of Wine, one ounce; mingle them and make a Liniment; which hath in it a wonderful virtue in mitigating of the pain, and ripening the* Pus.

This is likewise singularly useful,

Take *Oyl of Lin-seed, and Oyl of white Lillies, of each three ounces; Unguent Basilick, one ounce, and mingle them.*

And very useful likewise is the Oyl that is pressed forth of Hemp-seed. *Or,*

Take *Oyl of Hemp, and of Lin-seed, of each four parts; Honey, one part, Allum half a part; mingle them over the Fire.* Or,

Take *Oyl of Hemp, one pound; of Lin-seed, three ounces; Juyce of Plantane and Night-shade, of each a sufficient quantity; and boyl them, until the Juyces be confumed.* Or,

Take *Oyl of Hemp, and Flax, of each three ounces; Oyl of Roses, one ounce; Oyl of Mastick six drams; Oyl of Camphire half a dram; boyl them together, and let them be wel mingled, and used warm.* Or,

Take *Oyl of Flax, and of Hemp, of each four ounces; of white Lillies, Camomile, and Roses, of each three ounces; Oyl of Turpentine, one ounce; mingle them, and let them melt together.* Or,

Take *Turpentine four ounces, Frankincense and Mastick, of each three drams; Myrrh, one dram; Oyl of St. Johns-wort two ounces, the Yelks of two Eggs, Saffron a little, and mingle them.* Or,

Take *Honey and Turpentine, of each four ounces; Allum and Crocus Martis, of each two drams; Roots of round Aristolochy, poudered, and Aloes, of each half an ounce; and mingle them.* Or,

Take *Turpentine and Honey, of each three ounces; the Yelks of six Eggs; and boyl them to the Consistence of a Liniment.*

If there be any fear of putridness, (as nigh at hand) then these things following are to be made use of.

Take *Oyl of Hemp, Liquid pitch, and Turpentine, of each two ounces; Oyl of Roses, Mastick, Frankincense, of each one ounce; Allum half a dram; Galbanum, Nitre, Sal Armoniack, of each one ounce; Verdigrease, Oyl of Earth-worms, Pouder of Earth-worms, Oyl of Turpentine, white Vitriol, and Camphire, of each one dram; Oyl of Lin-seed, two ounces; mingle them, and let them melt over the Fire.* Or,

Take *Oyl of Hemp, and of Flax, of each one pound; Salt Armoniack, and white Vitriol, of each half an ounce; Verniss, three ounces; mingle them over the Fire.* Or,

Take *Oyl of Flax, and Oyl of Hemp, of each six drams; Salt Armoniack, and white Vitriol of each half an ounce; Treacle and Mithridate, of each two drams; let them melt together over the Fire.* If there be yet a greater fear of putridness, and a Grangrene, then there may be some Mercury Precipitate added unto the former Ingredients. As,

Take *the greater Basilick Unguent of* Mesues, *two ounces; fresh Butter one ounce; Mercury Precipitate two drams; and mingle them.*

But then that the afflux of the Humors may the better be prevented, Defensives are to be applied unto the more remote parts; from which this afflux may happen. As,

Take *Bole-Armenick, and Dragons blood, of each one ounce; Frankincense and Rose flowers, of each half an ounce; the whites of three Eggs; mingle them with as much Oxyrrhodium as wil suffice; and let them be put upon the part in a remote place.*

Or else let those parts be anoynted with the following Unguent.

Take *Oyl of Roses, Oyl of the rinde of Elder, and of Mastick, of each two ounces; Bole-Armenick half an ounce; the Santaline Unguent one ounce; Vinegar of Roses as much as wil suffice, and mingle them.*

Neither will it be amiss, to lay on some Cataplasm upon the wounded part it self, that may cherish the heat of the part, help forward the suppuration, and prevent putridness. As,

Take *Marsh-Mallow Roots one ounce; the greater Consound six drams; flowers of Camomile, Melilote, and St. Johns-wort, of each half a handful; Wormwood three pugils; boyl them to a softness, and then mash them together; after this, add of Barley Meal, and Bean Meal, of each one ounce and half; Wine as much as will suffice; boyl them again, and make a Cataplasm.*

whether the Seto may in this case be administred.

But now touching the Application of these Medicaments we are likewise to give you notice of this that it hath been in use with some, that if the bullet have wholly penetrated through any member of the Body, in so much that the wound appeared on both sides, they then administer their Medicaments by the *Seto* or *Setaceum*, made of Hemp, Flax, or Silk, which the Germans cal *Durchzug*; and as often as they open and uncover the Wound, drawing about the *Seto* this way and that way, they remove it, and anoint it with a new and fresh Medicament. But in regard that in this manner and by this means the passage forth of the *Pus* is stopt up, and a pain excited, it is apparent, that the use of these *Seto's* is not safe enough; since that the same may likewise be performed by Tents put in on both sides; and that Wounds which appear on one side only may be cured without any use of these. But yet nevertheless, the *Penecilli* or Tents themselves ought not to be over thick, lest that they hinder the issuing forth of the *Pus*, and cause a pain.

How often these Wounds are to be opened.

And indeed, it will be sufficient at the beginning that the Wound be dressed, and bound up once a day only, in regard that then at the First there is scarcely any thing in the Wound that will require Evacuation. But so soon as ever the *Pus* beginneth to flow, it is then to be opened and dressed twice a day; and when it floweth in that abundance, that unless it be often evacuated it may cause great grief and pain to the wounded person, then it will be requisite likewise to open and cleanse the Wound from the *Pus* or corrupt purulent matter, three times a day. But when the *Pus* begins again to be diminished in its abundance, it will suffice then twice a day to open and cleanse the Wound. And at length, when there floweth forth very little of the said *Pus*, and that the Wound beginneth to be filled up with flesh, it will then be sufficient to open, cleanse, and binde up the Wound once a day, as at the first. But First of all, we must endeavour that (here) there may be a passage opened for the *Sanies*, or thin Excrement, to flow forth, which in these Wounds is in great abundance heaped up, and gathered together, by reason of the Contusion of the parts, as also because of the fragments of the bones that Nature endeavoureth to expel: and this may be performed by Tents, that (if need require) may be hollow. And if *Splenia* (as they term them) or Linen thicker then ordinary, three or four times doubled, be imposed upon the bottom of the sinus; and that afterward the *Pus* and *Sanies* be pressed forth by a harder and closer binding, this will very much advance and help forward the flowing forth of the said *Pus* and *Sanies*.

But there is somtimes so great an abundance of the *Sanies* gotten together in the Wound, and the *Sinu's* are so deep and winding, that the *Sanies* cannot all of it either flow forth, or be pressed forth of the wound: and therefore then the *Sinus* is to be cut, that so the *Sanies* may flow forth, and the *Sinus* may be cleansed.

Neither are the vulnerary potions here in this case altogether useless and to no purpose; for in regard that they cleanse the Ulcers, and free them from the filth of the Excrementious Humors, and cause that all things in the Wounds that are from without (and Heterogeneous) may by Nature the more easily and sooner be thrust forth of the said wounds; if there be need of these potions in any other kind of Wounds, then certainly they are here most of all necessary. But touching these vulnerary potions we have spoken before, in the *eleventh Chapter*.

After that Concoction beginneth now to appear in the wound, (which seldom happeneth before the third or fourth day (in regard that by reason of the vehement Contusion of the part its heat was greatly weakned, and the spirits exhausted) and when there is now appearing neither any notable pain and Inflammation; and that which is bruised is for the greatest part turned into *Pus*, then the Wound is to be cleansed, filled with flesh, and at length shut up with a Cicatrice. And the truth is, when the wound is once become pure and clean, then it is very necessary that flesh be generated, because that the bruised flesh is all of it converted into *Pus*, and so the wound must necessarily become hollow.

Cleansers.

And indeed as touching Cleansers these ought to be either weaker or stronger, according as there floweth forth a greater or less abundance of the *Pus*, and according as the Wound is either more pure and clear, or else more foul and pollured. As,

Take *the Decoction of Barley, the Juyce of Plantane, Smallage, Agrimony, and the lesser Centaury, of each one ounce; boyl them, and in the end add, of Turpentine, three ounces; Honey of Roses, two ounces; Frankincense and Mastick, of each one dram; Saffron, one scruple; and mingle them.* Or,

Take *Meal of the bitter Vetch Orobus, one ounce and half; Frankincense, and Orrace Root, of each six drams; Juyce of Smallage, four ounces; Honey as much as will suffice;*

mingle

Mingle them over the fire, or,

Take *The Meal of Barly, and of Lupines, of each one ounce: Frankincense, Myrrh, Aloes, of each half an ounce; the pouder of Orrace Root two drams; Juice of Smallage and Wormwood, of each three ounces; Turpentine two ounces; Hony one ounce: let them be boyled unto the consumption of the Juices. If the Wound be fouler then ordinary, you may then add some of the Ægyptiack Unguent.* As,

Take *The Meal of the Vetch Orobus one ounce; Myrrh, and Frankincense, of each half an ounce; Turpentine and the Juice of Smallage, of each two ounces; Unguent Ægyptiack half an ounce; Mingle them.*

If the *Sinus* be very deep, it will be good then to wash it with the Decoction of the lesser Centaury, *Horse-tayle*, the greater Consound, *Birthwort*, *Orrace*, *Frankincense*; this Decoction must be made with Wine, adding thereto a sufficient quantity of Hony.

Medicaments that breed flesh.

But then for the breeding of flesh, let the Medicaments that were before propounded be made use of. And this following is likewise very useful in these Wounds.

Take *Oyl of Mastick one ounce and half; Rosin of the fir tree, one ounce; Manna Thuris (or the fine flower of Frankincense) half an ounce; the herb Horstayl, Tormentil, the greater Consound, St. Johns wort, Plantane, and Betony, of each half a handful; Earthworms washed in Wine two ounces; Wine as much as will suffice. Boyl them until the Wine be consumed: and afterwards strain them, with a strong expression and squeezing of them; and then add of Wax and of Goats sewet, of each four ounces; Frankincense, Myrrh, Mastick, and Aloes, of each half an Ounce; Mingle and make an unguent, which may be layd upon the Wound; and this Unguent may be covered with the Emplaster Diapalma. If the Wound be infected with poyson, then the Wound caused therby is to be referred unto the poysoned wounds; touching which we shal speak further in the following Chapter.*

But if the wounded part begin once to be taken with a Gangrene, then the cure is so to be ordered as we told you before, in the last *Chapter* of the second part, touching a Gangrene.

Wounds with a fracture of the Bones.

But now this is one thing that especially renders wounds inflicted by Guns difficult to be cured, when in the Arms, the thighes, and the Ankles, bones are broken; yea and many times shattered into divers fragments; in which, since that for the most part the Nervous parts are hurt, when these come to be purged from these fragments of the bones, there wil from thence arise most sharp and acute pains, convulsions, yea and the Gangrene it self, after all. Which if it happen, the Common Chirurgeons frequently hasten all they can to the amputation and cutting off of the whole Member. But although notwithstanding, that this may sometimes be done; yet nevertheless this is not to be put in practise so long as there is any the least hope left of a Cure; seeing that Nature is wont even in these wounds also to work miracles as it were.

The way of Curing is the same as of fractures with a wound; of which we shal treat further in the next part, to wit, the fifth, and the Second Chapter. The first and main care therefore must be, that the great fragments of the bones be restored again unto their places, and that they may be there joyned together: But yet nevertheless in administring of the splinters (which are otherwise wont to be applyed in the fractures of the bones) there ought great caution to be had; since that by the use of them there may easily be excited a pain, Convulsion, Inflammation, & at length the Gangrene it self; unto which Maladies these Wounds are otherwise obnoxious; like as also those Glutinating Cataplasms, (which stick so close and fast unto the part, and bind it so streightly together) have here no place; neither are they rashly and inconsiderately to be made use of, because that they bind together and streighten the part, and thereby cause pain. It is therefore most convenient, that after the bones are again composed and conjoyned, the Member be placed and fastened in a thin plate of Lead, or in a skin moystened, or with those slivers or chips that wheel-wrights (while they hollow the holes of their Carts and Wains) cut forth with the hollow Auger or Wimble, after they have been first moystened with water. For all these things as they hold the broken part together, so they do it in such a manner, that they may notwithstanding be bent as much as you please; that so they may not cause any pain.

But now in the stead of those Cataplasms there may be layd on some Emplaster or Cerote. As,

Take *Rosin and Wax, of each half a pound; the pouder of the barque of the teyl tree, one ounce and half; Turpentine two ounces; Bole armenick one ounce; the Juice of the herb Storks bill, or Cranes bill two ounces; boyl them to the Consistence of a Cerote.* or,

Take *Mucilage of the Root of the greater consound, the Gum or Juice that sweats out of the Apple tree, of each three ounces; the Juice of the greater Comfrey, and Bole Armenick, of each an ounce and half; the Juice of Cranes bill, six ounces; the powder of the rind of the*

Linden

Linden or Teyl tree two ounces; the yelks of twenty Eggs, Turpentine half a pound; the oyl of Earthworms three ounces, mingle them.

You shall have more of these prescribed, blow, in the fifth part, touching *Fractures.*

The Dyet.

Let the Air be dry; and in other Respects temperate; and rather inclining to heat, then cold. Let the Patients food be sparing; and yet nevertheless, there is here also a regard to be had unto the Patients strength, and his accustomed Dyet: and as in all other, so especially in this kind of Wounds, his Meats must be of a good Juice: but he ought carefully to abstain from all those meats that yield a naughty and corrupt Juice. Let the Patient altogether forbear the drinking of wine, unless he hath been much accustomed thereto: for whosoever he be that hath wholly accustomed himself to the drinking of wine he wil hardly away with the drinking of Water, in case Beer should be hard to come by. Let the Wounded person likewise carefully shun all occasions of Anger, abstain from all over swift and violent motion of the body; in regard that rest (*as Hippocrates* in his Book of Ulcers teacheth us) is the most fit and requisite for all that are wounded, and on the contrary, all labor hurtful. He must likewise avoid Venery, by keeping himself from womens company. And in a word, if ever there be need of an exact and accurate Dyet in other wounds; then certainly the most exact Dyet that may be is much more especially required in this kind of Wounds.

Chap. 21. *Of Poysoned Wounds.*

TOuching those poysoned Wounds, you are to understand that these poysoned Wounds require a peculiar kind of Cure by themselves; whether it be by poyson put upon the bullets, Arrows, Darts, or whatsoever other kind of poysoned Weapons; or else by the biting of any living Creature, as a Dog, or a fierce and raging Wolf, or some other poysonous Creature; or else by the blow of a Scorpion, Aspe, or any other venemous Creature whatsoever. And the very truth is that those wounds that are thus inflicted by the biting or strokes of poysonous Creatures (whether wild beasts or any other) they do more hurt by their venemous quality then by the Wound it self; which for the most part is but sleight; and of no great moment; whereas those Wounds that are inflicted by poysoned weapons do not only hurt by their poysonous quality, and by virtue of the poyson wherewith they are infected, but they are likewise oftentimes very dangerous simply as they are Wounds.

The Moravian Disease.

We must not here pass over in silence that Disease which is contracted from Scarifications; some have called it the new disease of Moravia, and the sickness of *Brunna*; because that it first of all began to shew it self at *Brunna* a town in *Moravia*, in the year 1577. touching which *Thomas Jordan* hath published a special Treatise, which *Johan. Schenckius* hath inserted in the sixth Book of his observations. And touching this same disease or plague, *Johan. Sporischius* hath written a Tract, and inscribed it, of the Symptoms of Scarification. And *Joh. Crato* likewise maketh mention of this same Disease, in his *Epist. collected by Scholtzius, Epist.* 139. The Sum of the whole business is this in brief. *All whosoever they were that in the year* 1577. *on St. Lucies day* (from what followeth notwithstanding I Collect this, that not only those that were thus scarifyed on the first day of Winter were taken with this Malady; but that all likewise that made use of these Scarifications from that first day of Winter, even unto the vernal or spring Solstice) *went into their publique Bath at Brunna, and had these scarifications administred to them, they instantly seemed to be taken and surprised with this Malady. Neither did they yet presently perceive the hurt and mischief thereof, although that forthwith there appeared some certain signs of the disease, now gotten into them. There were some that had the disease lying hid, and not discovering it self for the space of Eight days; in others the Malady lay concealed a fortnight, and in others during the whol time of their courses; to wit, according to the strength both of the Malady, as also of the party now affected therewith: But at length it manifested it self publiquely. In the mean time those that were taken with the disease were observed to be affected with an universal kind of sloath and dull sluggishness; and being thus taken with sloathfulness they became lazy, and altogether unfit and indisposed for the discharge of their Callings and wonted business; and they were likewise Melancholly, and of a sad countenance. The Native fresh colour of their face was suddenly turned into a paleness, the Vigor and quickness of their eyes into wilde and fierce lookes, there appearing in them a deformity with a dun and duskie Circle as it useth to be in women that have their Courses upon them. And then it soon discovered it self by manifest and apparent signs. After the application of Cuppingglasses, they were immediatly invaded by an extreme great and incurable heat; and after this there followed filthy impostumations, and*

putrid

putrid rotten Ulcers, flowing with Sanies *and foul black gore-Blood: and round about there appeared also certain pushes as broad as the Palm of the Hand, together with other running sores; out of which when they gaped, and were opened either with the Needle, or Medicaments, there issued forth a thin pituitous or Flegmatick matter, wheyish, and rotten, as also a snotty Sanies; and in others this thin pituitous matter was likewise sharp and corroding: then the Flesh al of it that was comprehended within the Circumference of the Cupping-Glass being corroded and putrifying sent forth a stinking savour, such as is wont to arise from the Telephian Phagedænical Ulcers. Where it was worth observation, and to be wondred at in the very beginning, that of so many Cupping-Glasses as were affixed (some having had ten or there about, and others also not above three of these Cupping-Glasses fastened and affixed unto their Flesh,) only one of them, or two at the most, of all these, brought forth any of the said filth and Corruption; the Mother in Law of one* Laurentius *a Taylor only excepted, who of fifteen that were applied, had three that produced of the aforesaid impostumated matter. You might have seen some of them with their whole bodies all overspread with Pustules or Pushes (as we cal them) their Face deformed, their Countenance sad and dejected, their looks terrible and frightful, their Back, Breast, Belly, Feet, even all places from the Head to the Foot of them, polluted and defiled with a scurfie scabbiness, and with Crusty Ulcers lifted up a little above the Skin, as broad as the Nail of ones Thumb, with a red Circle, and a white superficies and outside. And out of these Ulcers also did continually run a kinde of Fat liquor, and other Excrementitious filth and corruption, that did more resemble the thin and cleer Sanies, then the thicker Excrement that we cal* Pus. *Yea and moreover, the scabbiness being removed and cured, there stil remayned certain black spots, somewhat differing from those that appear in the* Impetigo *and the* Vitiligo, *which are of a dark, Leaden, and Duskie colour. In the progress of the Disease there grew together in the Head certain Callous or hard Crusts, which being with the greatest pain broken or dissected did sweat forth a kinde of matter not unlike unto Honey, and very tenacious (such a kinde of Juyce as we may see to destil from those Trees that bear a fruit like unto the Pine Apple) a certain substance (I say) thick and clammy, and therefore an Argument of the ripening and withering away of the flegm. These sordid and filthy impostumes (they being indeed of the worst sort of all others) were no sooner throughly cleansed and purged with a great deal of trouble, and much difficulty; and no sooner were those parts grown together with a little flesh brought over them, but out there breaks a new Symptom. The Limbs of the whole Body, the Arms, Shoulders, Shoulder-Blades, Elbows, Calves of the Legs, Ankles, and bottom of the Feet, they were all extreamly twinged and pulled with a certain kind of pricking, like unto stings; and as if they had been sawn assunder with some Iron Instrument. The members were all of them so heavy by reason of their weight, that they needed somthing to underprop them, and bear them up: yea and many of them also that had a palsie threatened unto them were fain of necessity to be born up, and carried upon mens Shoulders: And yet for all this they had no rest day nor night, being wracked with continual and incessant pains. And these tormenting pains were not for a day or two, but they lasted commonly for the space of a whole moneth. And the Head likewise that was not free. For besides the Achores above mentioned, together with the Gummy and Callous risings therein, (not unlike unto great warts) it was grievously infested with vehement pains (and especially about the hinder Region thereof) which by reason of the weakness and decay of the Parties strength, as also through the want of due rest and sleep, caused many of them to be Mad; which said Madness of theirs left them not until for a long while together very much of the aforesaid purulent snot and filth (of a most offensive and stinking Savour) had run forth from the Head by the Nosethrils. And all the whol time that the Disease had its course they took no pleasure at all in the gifts and comforts of* Ceres *or* Bacchus, *that is say, they were not at all delighted with their Food, whether Meat or Drink. They abhorred likewise and shun'd all manner of converse with others, either out of shame, or else for Anger and Indignation, when they beheld themselves (without any desert on their part, as they thought) quite over spread with a horrible and Contagious Disease, and of which they had smal hope to be recovered. This Disease continued the whole Winter long, even until the spring Equinoctial, that is, the Suns Entrance into the sign of Aries; about which time it manifestly declined, and was Judged to be quite ceased about Easter; because that after that time there was none found to be wholly overspread with this strange and (until then) unheard of Disease.*

As touching the rise and original of this Disease, there were two Opinions especially. For some there were that thought it to be a new kind of the French Disease, by Contagion or infection propagated in the hot House or Stove of the Bath: but others conceived that this poyson was communicated by the Scarification. The Chief Magistrate of the Town made a very diligent and strict

enquiry as touching the Cause of this Disease; but he could finde very little or nothing of a certainty. *Johan. Sporischius* (in his *Tract before alleadged*) admits of neither of these Causes before mentioned: but he conceiveth that this Malady had its original from a Pituitous and Flegmatick Cacochymy, heaped up in the Body by the unhealthy Constitution of that year; and withal that overmuch and Unseasonable Scarification drew these vitious Humors unto the Scarified places. And that he may the better prove this, he writeth many things touching the Scituation of this Town, and concerning the Dyet, and the Diseases of the inhabitants: and from all these put together he proveth that there was collected great store of this Flegmatick Humor.

And the truth is, that it is not altogether so plain and evident, from whence that Disease was at first contracted. For if it had its original from Scarification, then the Cause is not evident, wherefore this infection continued only from the Winter until the vernal or Spring Æquinoctial, and no longer (unless haply any one wil render this for a cause, that after this time none durst by reason of the fear they apprehended of a danger, make use of these Baths, or else because that this Bath was almost destroyed, and then again renewed) and why all the parts unto which the Scarified Cupping-Glasses were affixed were not exulcerated. For (in the Histories of the infected) *Thomas Jordanus* taketh notice, that a certain person who had five of these Cupping-Glasses affixed unto several places of his Body, yet that only two of all those places, (to wit, the hinder part of the Neck, and the Region of the left Loyn) were exulcerated; and he telleth us likewise of a certain Maid-servant that had seven of these Cupping-Glasses applied unto several parts; of all which, the Skin was exulcerated only under one of them, to wit, that which was affixed unto the right Shoulder-Blade: and there he assureth us that the very same happened also unto many others. But now, this seemeth to make very much against those who will have this Malady to proceed from the vitious conflux and storing up of the Humors, to wit, that there being at that same time three publique Baths at *Brunna*, they only were infected who made use of Scarification in that *Adams* Bath, which ought likewise to have happened altogether alike in them all, if the Disease had its original from the vitious Humors gotten together in the Body. But the opinion of *Sporischius* (as he determineth that this affect proceeded from the pituitous or Flegmatick Humor) doth no way deserve that any assent should be given unto it. For it easily appeareth unto any one that well weigheth the History, and considereth the Symptoms of this Disease, that the Cause of this Disease was from somwhat that was poysonous.

And yet nevertheless the Second opinion seemeth to me the more probable. For (like as *Crato* taketh notice, and giveth us to understand) since that there was not any one infected besides those that used Scarification, (and that also in this Bath only, and not in any other) it is therefore very likely and most agreeable to the truth, that by cuts and wounds inflicted by Scarification there was some kinde of poyson derived unto the Body; whether this poyson were imparted to the Body by the edg of the Penknife infected, or else by the Cupping-Glass, or by some poysonous Vapour of the Bath, or from the Water, or by whatsoever other means it were. For it is a thing generally wel known that Arrows are by many Nations infected with Poyson: which might likewise as well be done in the Penknife wherewith the Scarification was made, whether this came to pass by the Malice and wickedness of the keeper of the Bath, or else by his carelesness and want of Circumspection; whiles that with the very same Knife with which he Scarified some impure person, he likewise Scarified others, who were thereby infected; seeing that it is a truth very well known, that the opening of a Vein hath oftentimes fallen out very much amiss, that hath been performed by the same Penknife wherwith another mans Ulcer hath been opened. This poyson might likewise be communicated unto the Scarifying Knife from the Hone or Wherstone, (upon which these Instruments are wont to be rubbed hard, thereby to have an edg set upon them) if from the Vapor of the Bath any filth and Malignity should chance to stick unto them. There might likewise some contagion cleave fast unto the Cupping-Glasses, that are not alwaies wiped and made clean with that care and diligence as they ought to be. And Lastly, it is not altogether impossible that the Vapour of the Bath might insinuate it self into the Skin newly Scarified; or else into the water with the which the Scarified places are washed: which said Vapor is not evermore pure, but is somtimes defiled and infected by the sweatings, and filth, that come from divers persons. And that which also maketh much hereunto, may be this, that from those very Stones upon which the water is poured forth for the heating of the Stove or hot House there is lifted up great store of Vapors, which are not alwaies pure, but oftentimes very ill disposed, by reason of the

the filth and pollutions of the Bath, and the perpetual moystness of the place.

Another History of the like affect.

And in this opinion I am confirmed by a History of the like Scarification, that not many yeers since happened in *Franconia*; the History we have extant in the 2. B. of the *Medicinal Epist. Sect.* 6. of that Eminent and Famous Physitian, Dr. *Gregorius Horstius*; by which it appeareth that persons infected were al overspread with pustules or pushes, and as it were Cancerous Ulcers, not only in the Scarified places, but almost all the Body over; they suffered also very extream pains of the Limbs, (pains as if they would have even broken the bones,) whereby the Diseased persons were so greatly weakened that they were not able to raise them out of their Bed without the help of others, and by leaning upon them. But to conclude: this Malady altogether proceeded from the Malice and evil practise of the wicked Bath-keeper, who (as there we may finde it extant in his own confession) three or four times a week was wont to rub the Herb *Aconitum* upon the whetting block of Wood (being covered over with Leather or a Skin,) with which he was accustomed to sharpen the edges of his Penknifes; as also the pouder of the Metalick *Cadmia*, such as is digged out of the Earth; or the pouder of the stone *Cobaltum*, and Rats-bane; he confessed likewise that he rubbed upon his scarifying Knives the pouder of Locusts; and that he also dried Toads, and afterwards macerated the pouder of them in Water; which said water, together with the pouder, he poured out upon those Stones upon which (in the time of bathing,) the Water was wont to be poured forth; for the heating of the Stove or hot House, into which they entered when they went out of the Bath.

Signs Diagnostick.

Poysoned Wounds if they be inflicted by poysonons Creatures, this will appear by the relation of the sick person; and even by this it wil be known, that these Wounds proceeded from such kind of Creatures, because that they are envenomed. But if the Patient be wounded with a Dart, or any other kinde of Weapon, or a Leaden bullet, this is known by the extream great sense of pain and pricking that is felt in the wounded place; and by this also, that the Natural colour of the wounded part is quite altered and changed, degenerating into a Wanness and Leaden colour, or blackness; and that instantly upon it grievous Symptoms (for which no Reason can possibly be given) do follow upon the Wound; and that in the whole Body there is perceived and felt, sometimes an extraordinary heat and burning, and sometimes a kinde of stupidity and great streightning of the Heart, and sometimes the trembling of the Heart, together with dangerous fainting and swooning Fits.

For so soon as ever the poyson is received in by the Veins and Arteries, it immediatly diffuseth it self throughout the whole Body, and oppugneth the most principal members, and especially the Heart, (as it is the Nature of all poysons so to do) from whence divers Symptoms are excited. And these indeed are the more general Signs of a Poysoned Wound; unto which afterwards (according to the Nature of each Poyson) very many other Symptoms do adjoyn themselves.

Prognosticks.

1. Every Wound that is inflicted by any poysoned kinde of Weapon, or by the biting, sting, or stroke of any venemous wilde Beast, is far more grievous and dangerous then that Wound which is free from Poyson. And a smal Wound likewise when it is thus Poysoned may (and often doth) bring Death: whereas otherwise great Wounds may be healed.

2. And indeed by how much the more for number, and greater for danger, and contumacious the Symptoms are, and unyielding unto the remedies administred (though never so fit and proper) by so much the more dangerous they are, and for the most part deadly. But if the Symptoms be but few, and those not very grievous, and such as are mitigated by the Remedies administred, there is then so much the greater hope of Recovery and safety.

3. By how much the Poysoned Wound is nigher unto the Heart, by so much the more dangerous is it; and so likewise for that wound that is neer unto the Brain.

The Cure.

It sufficiently appeareth what Indications a wound, considered as a wound, pointeth out unto us, and supplyeth thus withal; and it is likewise sufficiently manifest (by what hath hitherunto been said) how it is to be cured. But now if we look upon it as poysoned, then we are to endeavour in the first place, that this poyson may not penetrate unto the more interior parts, especially the Heart; and then in the next place, that its power and strength may be broken and weakned by Alexipharmick Medicaments, which we commonly term Counter-Poysons. And therefore first of all, we ought carefully to heed whether any part of the poysoned

Weapon yet stick fast within the Wound. For indeed all our attempts of curing the Wound wil be frustrated, unless the weapon be drawn forth; and therefore we must labor that with all possible speed it may be taken forth by the operation of the hand: but if it cannot thus be taken forth, then together with the emplasters which have a power in them of calling forth the poyson, we are to mingle with them those things that are able to draw forth the Weapons and all other extraneous bodyes out of the Wounds; touching which we have spoken above in the eighth Chapter. And then moreover, that so the poyson may not penetrate unto the more inward parts, especially the heart, first of all (as *Celsus* in his fifth Book, *Chapt.* 27. teacheth us) *that member is to be bound up upon the wound, but yet notwithstanding this binding must not be overhard and streight, lest that the member should hereby be benummed, and lose all its sense and feeling*; or that (which somtimes through the unskilfulness of the Chirurgeons cometh to pass) it should be taken with a Gangrene. Then the poyson it self is to be drawn forth, and called out unto the more external parts. The Ancients to extract and call forth the poyson, were wont to appoint the sucking of the wound; and they who performed this office they termed *Psylly*; and they thought that these had a kind of propriety of attracting and drawing forth the poyson by sucking, and also of resisting the sayd poyson; whereas the truth is that it was only to shew their boldness and adventurousness in thus doing; touching which *Celsus* in his fifth Book, *Chapt* 27. thus writeth: *but if this indeed* (sayth he) *be not done* (*that is, if there be want of a Cupping-glass, or the like*) *then a Man is to be provided, who may suck the poyson out of the wound. Neither indeed have these men* (*whom they call Psylly*) *any more special and peculiar knowledg then others; but only a boldness and confidence confirmed by much use and practise. For the Poyson of a serpent* (*as likewise some certain poysons that Huntsmen use*) *hurt not by their tast, but only they impoyson a Wound. And presently he adds; and therefore* (sayth he) *whosoever he be that following the example of those Psylly, shall suck the Wound,* (*and yet would both himself be safe, and so also preserve him for whom he doth this office*) *let him carefully attend this advice* (*that so he perish not*) *that he admit not of any part of the Ulcer into his Gums, or his Palate, or any other part of his mouth.* Now the truth is that the poyson is most safely drawn forth by Cuppingglasses especially in the bittings and strokes of venemous Creatures; which said Cuppingglasses wil draw forth the poyson the more powerfully, if unto them there be added and administered Scarifications; and especially if they be made deeper then otherwise upon sleight occasions. After the removal of the Cuppingglasses, then the Gutts of Hens or other birds, or (if you please) the bodies of them being cut in the midst, the parts whiles they are yet hot may be layd upon the Wound. And if the place (be not nervous, (in the bitings of these poysonous Creatures) the flesh round about it is to be pared away, yea and quite cut off: And *Galen* relateth of a certain vine-dresser, that being bitten by a viper he presently with the pruning hook cut off the finger that was bitten; and so by thus doing escaped and avoyded all the danger. It will likewise prove to very good purpose, if the wound be washed with Vinegar or Wine in which Treacle hath been dissolved; or with the Decoction of Camomil-flowers or the root of the sowr or sharp dock Yea and in the bitings of poysonous Creatures (if the place that is wounded be not Nervous) a most effectual remedy is the Actual cautery, that by the force and power of the fire doth both consume the poyson, as also prevent and hinder the penetrating unto the more internal parts. But if the sick person wil not admit of an Actual Cautery, then the potentiall Cautery, or caustick Medicaments are to be administred. And care is likewise to be taken that the Eschar may fall off as soon as may be; and if it fall not off soon enough of it self, the wound is to be freed therefrom with the penknife; neither is the ulcer immediatly to be glutinated; and therfore an Onyon with Salt, or Wild Garlick, or Rue, are to be imposed upon the wound.

And these very things notwithstanding (although that Caustick Medicaments have not been premised) are to be imposed upon the Wounded or bitten place, for the drawing forth of the poyson; As for instance, the *Onyon, Wilde Garlick, Rue, Doves dunge, Wallnuts, with Garlick, Salt and Hony,* (as the Author of the Book of Remedies against poyson, telleth us in his fourth Chapter) which whether they be taken inwardly, or only outwardly imposed, are able to free from poysons (whether inwardly drunk, or else caused and brought upon the body by the bitings and strokes of venemous Creatures) *St. Johns wort, Swallow-wort, Elecampane, Raddish, Dittany, long and round Aristolochy.* Very useful also are *Carduus Benedictus, Scabious, Rue, Gentian, Vipers grass* and indeed all kinde of simples whatsoever that attract and draw poyson, either by a manifest quality, as heat; or else by an occult quality, and peculiar likeness. Touching the former this is to be noted, that in those

those parts that are Nervous we are not to make use of Medicaments that are over sharp, lest so while we seek to avoid one danger we fall into another as great, in exciting both a pain and a Convulsion. And therefore in such parts the safest way wil be to apply those Medicaments only that draw forth the poyson by the property of their substance. Neither likewise ought the use of sharp Medicaments alone to be long continued; but after they have been continued for a day or two, then after others more mild are to be imposed.

The Compositions are very many and various. Treacle is of singular use, if mingled with other Medicaments: which that some should therefore have in suspition in regard that by reason of the coldness of the Opium it may possibly drive the poyson inwardly, this is indeed a most ridiculous conceit, in a time of so much light from the truth. Or else drop in *Matthiolus* his oyl (which he describeth in his Comment upon the preface of the sixth Book of *Dioscorides*) or that of the great Duke of *Hetruria*; or the Juice of Vipers Grass.

Guido in poysoned Wounds commendeth this Emplaster.

Take *Galbanum, Sagapenum, Opopanax, Asafœtida, Myrrh, Pepper, Sulphur, of each one ounce and half; Doves dung, and Ducks dung, of each two ounces; Calamint and wild Mint of each one ounce; Let the Gums be dissolved in Wine; and mingling them all with honey and old oyl, make an Emplaster.* or,

Take *Turpentine, the Water or Juice of Swallow-wort washed, two ounces; the propolis of Beehives two ounces, Matthiolus his Oyl half an ounce; Oyl of Turpentine two drams, Precipitate a dram and half; Water Germander, and the Root of Vipers grass, of each four scruples; mingle them and make an unguent.* or,

Take *Ammoniacum, Galbanum, Bdellium of each half an ounce, Styrax Liquid three drams; Myrrh and Sulphur that hath not felt the fire, of each two drams; Euphorbium and Precipitate, of each one ounce; Matthiolus his oyl, and oyl of Turpentine, of each two drams; let the Gums be dissolved in scillitick vinegar, and then mingled with the rest; and then with as much Propolis and Ship pitch as will suffice, make a Cerote.* or,

Take *Root of Dragon wort, and Round Aristolochy, of each one ounce; Tabaco, and Water Germander, of each one handful; Frankincense, Myrrh, Brimstone that hath not been neer the fire, of each half an ounce; Dittany of Crete, Angelica Root, and white Dittany, of each three ounces; Oyl of Turpentine two ounces; Wax and Ship pitch, of each as much as will serve the turn; Mingle them, and make an Emplaster.* or,

Take *Tops of St. Johns wort two handfuls; Carduus Benedictus, Water Germander, Tobaco, Swallow wort, of each one handful; Rue one pugil, Root of Dragon wort two ounces; Sour or Sharp dock, an ounce and half; let them be well bruised together, and then applyed in the form of an Emplaster.* or,

Take *Oyl of Olives, and Honey, of each two ounces; Quick lime two drams, Roots of round Aristolochy one dram: make a Cataplasm.* or,

Take *Onyons, Garlick, Leeks, of each three ounces; boyl and bruise them, and then add the root of Dragon wort, and Asphodill, of each two drams; Treacle half an ounce; Oyl of Scorpions one ounce, and mingle them.* Or,

Take *Ashes of the herb Trinity or Hearts ease, and Quick lime, of each two ounces; Wormwood, Round Aristolochy, Rue, Garlick and Onyons, of each one ounce; Figgs twenty in Number; Goats dung, Oyl of Euphorbium, and Oyl of Scorpions, of each three ounces; Honey one pound and half; Wine Vinegar one pint; Mingle them, and make an Emplaster.*

More of these you shal have in the following sixth Book, touching the bitings of venemous Creatures.

And withall, (even instantly upon the receiving of the wound) there ought to be administred *Alexipharmaca* (or counterpoysons as we properly call them) that may Guard and fortify the heart from the poyson, and may expel it unto the outward parts. And indeed if the kind of poyson be known, we are then to oppose and counterworkit by its own proper and peculiar *Alexipharmaca*, touching which more in the following Book. But if the *species* or kind of the poyson be hid and unknown to us, then these universal or general *Alexipharmaca* (to wit) the *Bezoar* stone, Treacle, Mithridate, Treacle Waters, and others of this kind, (every where commonly known) are to be administred.

And with the very same the Heart is likewise outwardly to be fenced and guarded; and therefore not *Treacle* and *Mithridate* alone, but chiefly the Oyl of *Matthiolus*, is to be anoynted upon the Region of the Heart, and the Arteries; as also the Oyl of the *Great Duke* of *Hetruria*.

The poyson being drawn forth, we are then to hasten unto the Curing of the wound; for which purpose this Unguent is very usefull.

Take *Wax, black pitch, Rosin, the soft fat of a Ram, and old oyl, of each three ounces; Galbanum, six ounces; Make an Unguent.*

And afterwards, the Cure is to be performed as in all other Wounds.

But if we come to understand from the dangerous

gerous symptoms, (as cold sweats, faintings, swoundings, and the Syncope) that the poyson hath now already penetrated unto the more inward parts of the body, and especially the Heart, then the wounded part is not much to be troubled and tampered withall, but in this case we ought rather to take care for the preservation of the whole body, but more especially the Heart.

Chap. 22. *Of Particular Wounds.*

And hitherto we have been treating touching Wounds in General, as also touching the general Cure of them. But now in regard that the Cure of wounds is very different and various, according to the variety of the parts that are wounded; we should now therefore come to speak of them more particularly, (and in speciall;) to wit, of the wounds of each single part; But since that we have already handled them in our former Books, therefore here again to treat of them wil be a thing altogether needless and superfluous. For in Book 1. *Part.* 1. *Chapt.* 21. 22. 23. 24. *and* 25. We treated of the Wounds of the Head and Brain. Ibid. *P.* 3. *Sect.* 2. *Chapt.* 9. Of the Wounds of the Eyelids: *Chap.* 10. Of the Wounds of the Eyes. Ibid. *Sect.* 3. *Chapt.* 5. Of the Wounds of the Nosethrills. Ibid. *Sect.* 5. *Chapt.* 3. Of the Wounds of the Tongue.

Lib. 2. *Part.* 1. *Chapt.* 4. Of the Wounds of the Lipps. Ibid. *Part.* 2. *Chap.* 4. Of the opening of the vessels of the Lungs. Ibid. *Chap.* 11. Of the Wounds of the Lungs. Ibid *Chap.* 15. Of the Wounds of the Diaphragm. Ibid. *Chapt.* 17. Of the Wounds of the Chest. Ibid. *Chap.* 22. Of the Wounds of the spinal Marrow. Ibid. *P.* 4. *Chap.* 3. Of the Wounds of the Heart.

Book. 3. *P.* 1. *Sect.* 1. Of the Wounds of the *Oesophagus*. *Ibid. Chapt.* 16. Of the wounds of the Stomack. *Ibid, P.* 2. *Sect.* 1. *Chapt.* 8. Of the Wounds of the Intestines. *Ibid. P.* 4. *Chapt.* 7. Of the Wounds of the Spleen, *Ibid. P.* 6. *Sect.* 1. *Chapt.* 7. Of the Wounds of the Liver. *Ibid. P.* 7. *Sect.* 1. *Chapt.* 11. Of the Wounds of the Reins. *Ibid. P.* 8. *Sect.* 1. *Chapt.* 5. Of the Wounds of the Bladder. *Ibid. P.* 9. *Sect.* 1. *Chapt.* 5. Of the Wounds of the Testicles. *Ibid. Chap.* 11. Of the Wounds of the Yard. *Ibid. P.* 10. *Chap.* 15. Of the Wounds of the Abdomen.

Book. 4. *P.* 1. *Sect.* 2. *Chapt.* 1. We treated of the Wounds of the Womb.

Chap. 23. *Of the Diseases, and Symptoms that happen unto Wounds.*

And now, since that it often happeneth that other Diseases, as likewise divers symptoms do happen unto Wounds, and follow upon them; (al which yield forth peculiar Indications, and so draw the cure to themselves; deject and weaken the strength of the Patient, and render the Wounds very difficult to be cured, and dangerous) we ought therefore to treat of those also; and to shew you how and by what means they are to be removed and taken way; until which be done, no Cure of the wound is to be expected.

Of Feavers.

And indeed in the first place, it happeneth very often that Fevers follow upon Wounds And therefore although I have already treated of Feavers in a peculiar Tract by its self; yet nevertheless, in regard that it much concerneth us to know, and rightly to understand the differences of Feavers that follow upon Wounds, (that so we may the better remove them) we wil therefore herein this place speak somthing of them inspeciall, and particularly.

And therefore, first of al, we are diligently to inquire what the nature of this Feaver is that followeth upon the Wound, and what the Cause of it. For these kind of Feavers are very various; some of them being every day Feavers, having their Original from the great disturbance of the spirits, and the boyling heat of the blood; by reason of anger, Fear, and upon all occasions of the humors being disturbed by the motion of the body, or the commotion of the Mind. And moreover also, Secondly, these feavers happen while the *Pus* (and especially if there be great store of it) is in breeding, according to that of the 47. *Aphor.* of the *second Sect.* Thirdly, from an Inflammation; Fourthly, and somtimes these putrid Feavers are likewise generated from the putridness that is in the wounded part. And fifthly, from the store of the vitious humors.

The first kind of feaver from the disturbance of the humors.

The first kind of Feavers invadeth the Patient at the first in the very beginning; and (as I told you before) it proceedeth from the passion of the mind, and the motion of the body, and the disturbance of the blood and spirits following thereupon. And hitherto also belongeth most vehement pain, which by disturbing the humors, and causing restlesness, may both set on fire those humors, and the spirits, and likewise excite a Feaver. Their

Their Signs.

Now these Feavers are known by this, that they invade the wounded person instantly upon the inflicting of the Wound, and together with it. But yet notwithstanding because that the putrid Feavers may likewise somtimes invade the person immediatly, and even from the very first beginning, therefore by what Signs these *Ephemeræ* or every day Feavers may be discerned from the putrid, we have told you before; and the difference will sufficiently appear from what we have written hereof, in our *first Book of Feavers*, and *sixth Chapter*.

Prognosticks.

And the truth is, these Feavers of themselves bring with them no danger at all unto the sick person; and yet Nevertheless, neither can they at all promise any safety unto him, seeing that then the time of the fluxion and Inflammation, that are wont to follow upon the Wound, is not as yet overpassed and gone.

The Cure.

But now this Feaver requireth not any peculiar Cure; but (if the Patient will but only submit himself unto the strict Rules of Dyet) soon vanisheth of its own accord. But yet nevertheless all the Causes thereof (if they be yet present, or that there be any fear of their returning) are to be removed: for otherwise they may easily draw upon the person some kinde of danger. And in regard that otherwise (about the fourth day) Inflammations and fluxions are wont to happen; these Feavers, if they continue so long, (as until the said fourth day) may possibly attract and augment those Evils.

A Feaver from the generating of Pus:

And then again, while the *Pus* is in breeding, (and especially, if there be a great abundance thereof generated) Feavers are caused; as *Hippocrates* telleth us, in the 2 *Aphorism. Sect.* 27. For then, whatsoever over aboundeth in the wounded part, and cannot be changed into the substance of the part, beginneth to putrefie, and there is caused (as it were) a certain kinde of boyling forth of putrefied mattier. And yet notwithstanding Nature doth what lieth in her power, and what she is not able to turn into the substance of the part, she doth what she can so to work and frame it, that it may not be altogether corrupted, but most of it turned into *Pus*. And therefore from this Ebullition or boyling there is indeed a heat of the blood in the Veins and Arteries communicated unto the Heart, which when it is thither come it kindleth a Feaver, that is like unto an *Ephemera* (of many daies) rather then to putrid Feavers properly so called.

Signs.

And therefore the Signs of Putridness are absent, and appear not, (and so likewise for the Signs of an Inflammation) and these Feavers invade the wounded person at that time wherein the *Pus* is wont to be generated; and especially about the fourth day. The heat is much, but withall sweet; the pulse great, swift, and frequent. The Urine differeth and recedeth but little from its Natural state; and there is no ill and dangerous Symptom Joyned together with it, to accompany it.

Prognostick.

This Feaver of it self hath no danger at all in it, but soon after ceaseth.

Cure.

And this that it may so much the sooner be done, there is a passage forth to be made for the *Pus*; and this so much the more speedily, if the *Pus* be conteined in a more noble part, or in a part that hath consent with some one of the more principal and noble parts: and withal we are to endeavour that al the afflux of the Humors may be hindered and prevented.

Feavers from an Inflammation.

And Thirdly, Feavers are somtimes kindled from the Inflammation that followeth and happeneth unto the wounded part; somtimes Quotidians or every day Feavers; and somtimes putrid Feavers; even according as the Spirits Wax hot, and this heat is communicated unto the Heart; and also according as the putrid Vapours transfused into the Veins and Arteries do penetate unto the Heart, and heat it.

Signs.

Now these like Feavers are known from the Signs of an Inflammation; touching which we have spoken in the *first Part*, and 5. *Chapter*. But whether the Feaver be a Quotidian, or a right putrid Feaver, this may be known by the Signs of them both; of which we have likewise already spoken in our *first B. of Feavers*; and especially, that in the Quotidian the Signs of putridness disappear in the Urine, whereas in putrid Feavers they appear therin. And so the heat in putrid Feavers is far greater and sharper, then in Quotidians; and so are also the Symptoms more grievous; and withal there is a greater dejection of the strength and powers of the Body.

Prognostick.

Now these Feavers in regard that they wholly depend upon the Inflammation, they are therefore greater or less, according to the greatness of the inflammation; and so likewise more or less dangerous.

Cure.

These Feavers are taken away and Cured, upon

on the removal of the Inflammation, like as al other Symptomatick Feavers; touching which we have already spoken in their proper place. And therefore we ought in the first place to do our endeavour, that by coolers and other convenient altering Medicaments this Feaver may be Cured; lest that otherwise a putridness be excited in the Humors; or if there be now already present any putridness, that it may be restrained and kept under.

Feavers from the putridness of the Humors:

And Fourthly, There happen likewise feavers unto Wounds, kindled even by the putridness of the Humors that are in the Wound it self; as being neerly related and allied unto those things that are raised and have their rise from the *Pus* or thick purulent matter.

Signs.

Such Feavers as these are known from the Quantity & quality of the Excrements of the wound. For there floweth forth great store of *Sanies*, and this resembleth somthing that is putrid, rather than good & laudable *Pus*; and it is of a various and evil colour, and of a very unsavoury and offensive smel. And although there should not flow forth any great store of *Pus* or *Sanies*; yet nevertheless if the matter that floweth forth be naught and corrupt, if the colour of the part be changed, and if there be present any pain and heavinesss in the part, it is then indeed a sign and token that there is present a vitious matter, and that it hath not been sufficiently purged forth. But in the mean time there will be present, and appear, the signs of a Feaver, which will shew unto us in the Urine the Notes and Marks of putridness; or it may be they shew us none; according as the matter is more or less communicated unto the Veins, and Arteries.

Prognostick.

And as for these kinde of Feavers, they are more or less dangerous, according as the putridness is greater or less; and likewise as it is in a part more or less noble, and accompanied with more milde and gentle or else more sad and grievous Symptoms; and according as there may be made a passage for the more easie or more difficult flowing forth of the vitious matter.

Cure.

The Cure consisteth in this especially, that the putridness in the part affected be with all speed, and as much as may be, restrained and kept under, and that by all means possible there be a way and passage made for the vitious matter to flow forth. For the putridness being taken away and removed, the Feaver soon after easily vanisheth of its own accord.

A Feaver from the vitious preparation of the Humors.

And Lastly, There is also a kinde of Feaver, which ariseth (in wounded persons) from the storing up and the great provision that hath been made of vitious and naughty Humors, and the ill preparation of them. For if the wounded Body be impure, it may then easily be, that a Feaver may be kindled in it upon the occasion of the Wound. Now this is done in a twofold manner, and upon a double account. First of all, from the commotion and disturbance of the Spirits and Humors, after the receiving of the Wound. For as in Bodies otherwise impure there are Feavers oftentimes kindled from the passions of the minde, and Commotion of the Body; (even as we see it to befal Women that have hard labour in Child-bed) so the very same may likewise happen in those that are wounded. And furthermore a Feaver is also kindled from a putridness in the wounded part. For as in Child-bearing Women there are Feavers oftentimes kindled from the retention of the Secundine, and the blood that usually floweth from them after the Childe is born; (and this so much the more easily, if their Bodies be impure) even so if any putridness be kindled in the wounded part, and that the depraved Vapors communicated unto the Veins do finde any vitious Humors in these Veins, then a Feaver ariseth thereupon. Now these Feavers are various, (according to the different preparation of the vitious Humors;) somtimes intermitting, and somtimes continual; according as this treasury of the vitious Humors is laid up either without the *Vena Cava* (viz. the great hollow Vein) or else sticketh fast in the same; and indeed for the most part they are Tertians either continued or intermitting, (single, or double) and very rarely Quotidians; and most seldom, Quartans.

Signs.

These Feavers are known, in that both the heat, and the Urine, and the pulse, do all of them discover sure signs and tokens of a putridness. But now whether these Feavers are kindled only by the commotion and disturbance of the Humors, or else from the putridness in the wounded part, it is known by this, to wit, that if the Feaver proceed meerly and only from the Commotion of the Humors, then such a Feaver invadeth the person immediatly and in the very beginning; and there is no vitiousness or fault at all to be found in the Wound. But if it proceed from any putridness in the Wound, then the Feaver appeareth not instantly, and at the very first, but after a short time; and then there are Signs and tokens of Putridness in the Wound

Wound it ſelf. But then for the Nature and Quality of the Feaver, it is to be known from the proper Signs of Feavers.

Prognoſtick.

Of theſe Feavers, ſome of them are more dangerons then other ſome, as we have already told you before, in its proper place, touching Feavers: and intermitting Feavers they are of themſelves altogether void of danger; but the Continual are ſomwhat more dangerous; and that likewiſe more or leſs, according to the quality and condition of the putridneſs. But yet becauſe that theſe Feavers happen and follow upon Wounds, they al of them therefore bring ſome danger along with them, more or leſs. For whereas the wounded part was weak before, now the Feaver happening thereupon increaſeth the debility, and ſo augmenteth the danger thereupon depending; and thus it may very eaſily come to paſs, that at the part affected there may be a fluxion excited; or elſe by reaſon of the heat weakned upon the aforeſaid Cauſe very many Excrements may be generated in the part, and from hence other evils may be excited.

Their Cure.

Now as for the Cure of theſe Feavers; albeit that they are occaſioned by the Wound; yet nevertheleſs becauſe that the vitious proviſion of Humors is the principal cauſe of them, therefore theſe Feavers are to be cured in that manner we told you of in its own proper place.

Touching the Inflammation.

Now very often there happeneth unto Wounds an Inflammation; and ſomtimes likewiſe an *Eryſipelas*. And indeed an Inflammation doth moſt commonly (if not evermore) follow upon the inflicting of a Wound; and more eſpecially in the Nervous parts; in regard that the afflux of Blood unto the part affected ſtirreth up and cauſeth a pain therein; and moreover, becauſe that the Blood when it cannot ſufficiently flow forth from thence it putrifieth, and very eaſily exciteth an Inflammation, which is prevented by a due and ſufficient efflux of the Blood; touching which *Hippocrates* thus writeth, in his *B. of Ulcers*.

If there flow forth of the Wound Blood more or leſs, according to the ſtrength of the wounded perſon, then both the Wound it ſelf, and thoſe parts that are neer about it are the leſs troubled and affected with any Inflammation that ſhall follow upon the Wound.

And therefore if there be any cauſe to fear an Inflammation; and if the blood hath not ſufficiently flown forth, then forthwith a Vein is to be opened in the oppoſite place; and the Blood is to be evacuated according to the ſtrength of the ſick perſon, and as he is well able to bear it. Yea and moreover, if there be already preſent an Inflammation, and that the Patients ſtrength will bear it (and neceſſity ſo require) Veneſection and Purgation are both of them to be adminiſtred, according as there ſhall be need.

If the Inflammation be excited from pain, then we are to endeavour that the ſaid pain be taken away, and withal that the afflux of Humors be repreſſed. *Avicen* for this uſe highly commendeth the Cataplaſm that is made of the *Pomegranate* boyled in aſtringent Wine, then bruiſed in a Mortar, and ſo made up into the form of a Cataplaſm. There may likewiſe a Cataplaſm be made of the *meal of Barley, of Sea-lentiles, Mouſe Ear, and Oyl of Roſes*. But if the Inflammation be not removed by theſe, the reſt of the Cure is then to be performed, as we ſhewed you before in the *firſt Part, Chap.* 5. *Touching an Inflammation.*

Of the Eryſipelas.

If an *Eryſipelas* follow upon the Wound, this will ſoon appear from thoſe Signs that we gave you in the *firſt Part*, and 7. *Chapter*, touching an *Eryſipelas*. And in what manner it is to be cured, is manifeſtly declared by thoſe things that are there ſpoken of. And the truth is, *Hippocrates* (in his B. of Ulcers) teacheth us, that whenſoever an *Eryſipelas* ſhall follow upon an Ulcer, that then the Body is to be purged. And indeed, if it be ſo that Choler abound, (leſt that there ſhould be an afflux thereof unto the Wound) it will be very expedient wholly to evacuate the ſame. And yet notwithſtanding, becauſe that the *Eryſipelas* (which we cal *Roſa*) hath its original rather from the thinneſt of the Blood, and that part of it that is peculiarly corrupted; Sudorificks are therefore moſt eſpecially uſeful, as there we told you. *Hippocrates* was wont to impoſe upon the part affected the Leaves of Woad, or the Juyce thereof with Clay. We may likewiſe apply unto the place affected Cataplaſms of *Barley meal*, and *Eldern Water*, and other the like, ſuch as we have there mentioned, to wit, in the *place before alleadged.*

Of the Super-excreſcent Fleſh.

And ſomtimes likewiſe it ſo happeneth, that the Fleſh becometh Luxuriant and proud (as we term it) and groweth forth beyond all Reaſon and meaſure; which hindereth the production of the Cicatrice, and its covering over of the Wound; or at leaſt it cauſeth the ſame to be unſightly and deformed. But this happeneth through the unskilfulneſs

or want of care in the Physitian, who administred Medicaments that were not sufficiently drying. And therefore what Flesh we finde to be superfluous we must take it away, that so the Wound may be shut up with a Cicatrice.

But now this is the work of the Physitian, who is to consume the superfluous Flesh with Medicaments that are sufficiently strong in their drying, cleansing, and (if need so require) somwhat Corroding likewise.

But now what those Medicaments are with which this may be done, we have told you before, in the 2. *Part*, and 7. *Chapt.* whither we refer you. Of all which Medicaments there mentioned the most useful and principal is the Green Water there spoken of; which both consumeth the superfluous flesh, and likewise bringeth the Cicatrice over the Wound when it is cured.

Of the Hæmorrhage.

There happen also many Symptoms unto Wounds; which partly deject the strength of the Patient, and partly render the Curing of the Wound more difficult then otherwise it would have been. And first of all, there oftentimes happeneth indeed an extraordinary great Hæmorrhage and profusion of the Blood; which doth not only deject the strength and Spirits, (depriving the Patient oftentimes of his Life) but it likewise very much hindereth the Cure. For so long as the Flux of Blood lasteth, there can nothing at all be done in the Cure. Now that said Hæmorrhage happeneth upon the wounding of the greater Veins, as also the Arteries, not only the greater of them, but the mean and middle sort of these Arteries. But touching this Symptom we have already spoken above in the 14. *Chapter.* where you may see further.

Of pain with the Wound.

And oftentimes likewise there is an extraordinary vehement pain following and accompanying the Wound. For although there be indeed hardly any Wound without pain; yet nevertheless very usually this pain is tollerable, and such as the Patient can wel bear. But somtimes it is vehement and altogether intollerable: which happeneth more especially, when the Nerves and the Nervous parts are hurt and Wounded: and an extream vehement pain arising immediatly upon the inflicting of the Wound is a sure and certain Sign and token that either a Nerve or a Nervous part is wounded.

The Cause.

Now this pain is excited in Wounds, somtimes by reason of Errors committed by the Patient in the Course of his Dyet whiles he eateth all manner of bad and corrupt food; as Cabbage and Cole-worts, salt Fish, Swines flesh, or the like; whiles he exposeth the wounded part unto the cold Air, and moveth it overmuch by exercise. And somtimes also this pain happeneth by the Carelesness of the Chirurgeon, who administreth Medicaments that are overhot, and too sharp; bindeth the part too hard and streight, placeth it not aright, thrusteth into the Wound Tents over long, or thick; leaveth the *Pus* over long in the Wound, and suffereth some piece of bone to prick and molest the part that lieth next unto it. And somtimes also, without any of these Causes, a pain may be excited by an internal afflux of the Humors; and this pain oftentimes invadeth the wounded person suddenly, and with a certain unwonted coldness and Chilness; and this is oftentimes a very shrewd sign of some great Inflammation instantly to follow, or even of a Gangrene very nigh at hand; and this especially, if together with the pricking pain there be perceived a certain heat in the Wound.

Prognosticks.

Now these extraordinary and over vehement pains in Wounds are wont to be the Causes of grievous Evils. For besides that they cause a restlesness and want of sleep, and deject the stength of the sick person, they are likewise the Causes of the afflux of Humors unto the wounded part; whereupon Inflammations, a Feaver, somtimes also the Gangrene, are excited and brought upon the party. Touching which *Galen* also very frequently giveth us notice. *There is nothing* (saith he) *that more increaseth the Phlegmone then pain*; as he writeth in his 5. *B. of the Meth. of Curing*, and 4. *Chapt.* and in the 3. *B. of his Method, Chapt.* 2. and 6. *By reason of pains* (saith he) *the parts are troubled with and lie under fluxions.* And in the 13. *of his Method, Chapt.* 5. *Pain, and the heat of the member in which the Erysipelas resideth, (although the whole Body be pure and free from Excrements) become the Causes of a Fluxion.*

That therefore the pain may be taken away, we are to make diligent enquiry, and finde out, whether this pain proceed from any Errour and fault in the sick person, or else from the Carelesness of the Chirurgeon: and if any such Cause shall be discovered, it is to be removed before any thing else be done. But if no such Cause shall appear, but only that somthing extraneous sticketh in the Wound, this is without any delay to be drawn forth. If the pain proceed from the abundant

abundant store of the *Pus* retained and kept in; then a free and open passage is to be made for it that so it may freely flow forth But if it proceed from the overgreat Afflux of the humors (like as it is wont to be in an Inflammation) then we are to make use of those Medicaments that restrain the immoderate & excessive afflux of the humors; as also we are to administer Medicaments both rarifying and Anodyne. And very useful here is the *Oyl of Roses* with the *white* of an *Egge*, and the *yelk* of an *Egge* (according as the Case shal require) and in which *Earth worms* have been boyled: as likewise the Oyl of *Camomile*, of *Linseed*, of *sweet Almonds*, of *Earth worms*, and of Elder. A Cataplasm of the *Leaves of Mallows*, the *Roots of Marshmallows*, *Barly meal*, *Bean Meal*, and *bran*. But if the pain be greater then ordinary, we may then make use of the Oyl of *Poppy*, and of *Water-Lilye*; as likewise of the Cataplasm that is made of the *Leaves or Root of Nightshade*, and *Hoggs grease*. As for Example;

Take *Oyl of sweet Almonds*, *Oyl of Roses*, *and of Camomil*, *of each one ounce*; *the yelk of one Egg*, *and Saffron half a scruple*, *Mingle them &c.* or,

Take *Root of Marshmallows half an ounce*; *Mallow Leaves one handful*; *Elder flowers two pugills*; *boyl them all unto a softness*, *and then passt them thorow a hayre sieve*, *adding unto them the powder of Camomile flowers half an ounce*; *Barley Meal one ounce*; *Bean Meal and the Meal of Linseed*, *of each half an ounce*; *Make a Cataplasm hereof. Unto which (if you please) there may be added the Oyl of Roses*, *of Camomile*, *of white Lilyes*, *of Mastick*, *and the Unguent Dialthæa.*

If the pain be not asswaged by all these Medicaments, it is a sign that some Nerve is greatly hurt. And so then the cure ought in all respects to be carryed on, as that we mentioned above in the 15. Chapter touching the wounds of the Nerves.

Of Convulsions, and Convulsion Fits.

There happeneth likewise now and then a very grievous and dangerous symptom unto Wounds; to wit, a Convulsion, or Convulsion Fits, (the *Latines* term them Convulsive motions) touching which symptom many are wont to treat at large, touching Wounds. But in regard that we have already (in the first Book of our *Practise*, *Part.* 2. *Chapt.* 20.) spoken enough of a Convulsion in general; we shall here only set before you those things that are proper unto that Convulsion which is wont to follow upon Wounds.

Causes.

As for the Causes of the Convulsion; Convulsions are caused in Wounds, either from a pricking of the Nerves, and their extreme vehement pain, or else from some sharp and Malignant, either humor or vapour, pulling and twinging some Nervous part, or the Membranes of the Brain: for the expulsion of which when Nature beginneth to bestir her self, she then exciteth this Contraction, and Convulsive Motions. Touching which *Hippocrates* (in his 65 *Aphorism* of the fifth *Sect.*) thus writeth: *Those* (saith he) *that together with their Wounds have conspicuous Tumors*, *these are not greatly troubled with Convulsion fits*, *but they are taken with a kind of Madness. But these tumors suddenly vanishing* (*if this indeed happen on the hinder part*) *then Convulsions and Cramps follow thereupon.* And *Galen* (*in Art. Medica*, *Chap.* 92.) *saith*, *that the pricking of a Nerve and Tendon*, (*by reason of the vehemency of the sense*, *and because this part is knit together with the principium*, (*that is*, *the Brain*) *it is therefore very apt to excite and cause a Convulsion of the nerves*; *and then especially when nothing breatheth forth outwardly*, *the wound of the skin being closed and shut up.*

And indeed the matter exciting a Convulsion doth it sometimes only by its Acrimony, and somtimes also by its malignity; like as we see the very same to happen in Wounds and strokes, and bitings of venemous Creatures.

Prognostick.

Now these Convulsions or Convulsive Motions are very dangerous in wounds: touching which *Hippocrates* (*Sect.* 5. *Aphor.* 2.) sayth thus; *The Convulsion that followeth upon a Wound is Mortal.* and in the 5. *Sect. Aphor.* 3. *The Convulsion that followeth upon an extraordinary Flux of the blood*, (*or a sighing and sobbing upon the same occasion*) *is very evil and dangerous.*

Cure.

But now, as for the manner and method of Curing these Convulsions, we have shewed it unto you, in our 1 *B. Part.* 2. *Chapt.* 28 and there you may see enough hereof. And therefore here in this place we shall only give you notice of these things following. First of al, that in Convulsions and Convulsive Motions that happen unto Wounds (whether it be of themselves, or by Consent with some other part, how and in what manner soever it be) we ought to have a special regard unto the Brain, spinal Marrow, and the Nerves that proceed from these; and thereupon we are to anoynt the Neck (both

before and behind) and the whole ſpinal Marrow, with Convenient Medicaments; ſuch as we have already mentioned in the place alleadged. *Cæſar Magatus* (in his firſt *B. Chap.* 77.) Commendeth this following.

Take *Oyl of Bays, of Juniper Wood, of Juniper Berryes, Mans Fat, and Oyl of Earth Worms, of each four ounces; Oyl of Roſemary flowers, Lavender flowers, and Sage flowers, of each two ounces; Oyl of Peter, and of Turpentine, of each half a pound; Oyl of Tile, and the oyl of Been, of each three ounces and an half; Myrrh, Frankincenſe, Ladanum, Benzoin, and Gum Juniper, of each three ounces; Oyl of Cinamom, of Cloves, Mace, Nutmeg, of each one ounce and half; Bdellium two ounces: Ammoniacum, Opopanax, Galbanum; of each one ounce; Indian Tacamahaca, and Caranna, of each four ounces; Caſtoreum, and Saffron, of each ſix drams; the Root of the herb Maſterwort. Angelica, Valerian, Acorus, Coſtus, of each half an ounce; Fat ſtyrax Calamite one ounce and half; the fat of a Lion, and Bulls fat, of each two ounces; the beſt burning Water one quart; and mingle them wel together.*

And Laſtly, if the Convulſion happen from the Retention of the *Pus* or other excrements; then we are to endeavor that by all waies and means a paſſage forth may be made for both the thin and thick excrements and that there may be ſome liquor dropt into the Wound that hath in it a power and virtue to cleanſe and conſume. And outwardly alſo there ought ſomewhat to be impoſed that hath a power of drawing from the depth and bottom of the Wound; which kind of Medicaments may ſufficiently be known from what we have written before, and more eſpecially, touching the Wound of the Nerves.

Chap. 24. *Whether it be lawfull for a Chriſtian by Amulets, (the Greeks call them* Periapta, *we Preſervatives) or elſe by hanging of Seals about their bodyes, or by the like means, to defend and preſerve themſelves from all danger by Weapons?*

SInce that there is nothing now adays more frequently practiſed by Soldiers, then by certain Amulets (or Periapta) as alſo by Seals and Characters, to fence and Guard themſelves againſt all thruſts and Strokes of Weapons, and Gunſhot, (and ſo to render themſelves altogether inviolable;) before we end this diſcourſe touching Wounds, we think it not amiſs (for a Concluſion) to add and diſcuſs this queſtion; whether it be lawfull for a Chriſtian, and whether he may with a ſafe Conſcience, (and without breach of Piety) in any ſuch manner as aforeſaid make his body weapon-proof, and impenetrable by Gunſhot.

For although I neither deſire to make any inquiry into the ſecret and private practiſes of theſe kind of Perſons, nor think it worth the while ſo to do; yet notwithſtanding this is a thing very well and commonly known, that theſe men cannot Guard and fortify themſelves from all kind of violence whatſoever; but only againſt the thruſts and ſtrokes of Swords, and other the like Weapons, as alſo from Musket and Piſtol bullets, ſo that ſuch like Weapons, and ſmaller Gunſhot ſhall not by any means be able to penetrate their skin. But yet theſe perſons may by Clubs be dry-beaten, and by bullets ſhot forth of the greater Guns (as Ordnance, and the like) be hurt and violated; yea they may hereby likewiſe be deſtroyed, although it be true, that their skin cannot eaſily be wounded. Yea moreover (even as themſelves confeſs) there are ſome certain parts that cannot thus be ſafe-guarded and preſerved impenetrable and inviolable; and more eſpecially their Eyes. And moreover this is likewiſe commonly reported, that ſome of them can make not only themſelves, but that they can render even the bodies of others ſo impenetrable and inviolable, that they ſhall not be hurt by any kind of Weapons; yea that ſome of them are able to cauſe, that butter ſhall not be cut, either by knife, Sword, or by hatcher. And thirdly they report this alſo that ſuch as are altogether ignorant and unwitting unto any ſuch practiſe, may likewiſe by others be made inviolable, and proof againſt all kind of Weapons and Darts.

The various wayes and manner by which ſom make themſelves impenetrable by weapons.

But now they have divers waies & means of making themſelves thus impenetrable and weapon proof, which I neither know nor deſire to know. In the general, I ſhall only acquaint you with one or two of thoſe things that are commonly carryed about by them; that ſo by them you may likewiſe know how the better to Judge of all the reſt. And firſt of all, it is ſcarcely unknown to any, that there are certain Seals or *Pentacula* (as they call them) that are graven with figures and Characters, and ignorantly lettered (as *Apuleius* ſpeaketh) and theſe are carried up and down, and by the Souldiers hung

hung about their Necks; and they are wont also to be bound unto their Body; that so by them they may render themselves inviolable, and not to be hurt by any Weapons. And some there be, that only inscribe these kind of Characters upon a piece of paper, and so hang them unto their Bodies. And I my self knew a man, who reported that he hung one of these sheets of Paper about the Neck of a Dog; and then he shot him close at hand with a bullet out of a hand-Gun, and yet the Dog was not at all any whit hurt thereby. And there are some likewise, who swallow down these sheets or pieces of paper thus Figured and Charactered. And there is extant in a certain publique writing an instance of the like Artifice (if we may so call these delusions and impostures of the Devil) by which a certain Gentleman fenced and guarded his Body against all kinde of Weapons. Which practise of that renowned Commander (that so valiantly and successfully fought many battles against the Turks, in the behalf of the Christians in *Hungary*) whether it make more for his praise or dishonor, I leave it free unto any one to Judg thereof. I shall only say this, that oftentimes even great persons (Princes and worthies) have been deceived in this kinde, and have too incautelously given Credit unto these Cheaters and deceivers (who go up and down selling these things, and oftentimes putting them off at very dear rates) and have not sufficiently weighed and considered the dangerous consequence of what they go about. And therefore, as for the Course that these men take (seeing that it is altogether superstitious & impious) I do not think it any waies fit for me by my writings to propagate it unto Posterity: and yet notwithstanding, that the superstition and wickedness of this practise may appear, I will in the general speak somwhat thereof, and delineate it in some particulars. At the sacred time of our Saviours Nativity (or as we call it, Christmas) about midnight in a sheet of Vellom or Parchment there are these letters inscribed. I. N. R. I. and this same sheet of Parchment is closed up in certain bals or Lumps of Wheaten dough, which are privily put upon the high Altar, that so at certain and divers times three Masses may be celebrated over them. And then one of these little balls (with certain superstitious prayers they have for that purpose) must be eaten in the morning; and this wil for that day preserve the man safe and sound from all kinde of Wounds whatsoever.

In the same little Book, (the writing before mentioned) we are taught, in what manner on the day any wound is inflicted, before Sunrising, the Moss is to be taken and shaved from the Skul of one that was hanged or broken upon the wheel, (and this with certain prayers) which if sewed into the Garment under the left Arm-pit, and worn, will in like manner preserve the man inviolable, and not to be hurt by any Wound.

And there are some also who Wound their Skin; and then they put upon the Wound these kinde of Parchments, or some other things Charactered (as before) and so they Conglutinate the said wound, and close it up. And there are likewise (without doubt) many other such like waies and means well known to Souldiers; in the discovery of which I intend not at all to be Curious, or in the least to trouble my self.

The Authors of this practise.

If enquiry be made after the Authors of these Diabolical Practises, the prime and chief of them are for the most part unknown; and these things are by the incautious Souldiers derived from one to another, and from hand to hand. And if we should trace the Authors out even unto the very first of them, we shall finde the first Author hereof was (doubtless) some Devil and wicked Spirit, as we shall anon shew you. They do acknowledg that oftentimes hang-men or the common Executioners are the Authors of this wicked Artifice, as being a generation of Men for the most part much addicted unto Magick. And so the *Passavian* Art (as they cal it because that it first came to be known in that Army which being raised about *Passavium* afterwards in the yeer 1611. brake into *Bohemia*, & took *Prague*, and was every where divulged up and down the Country, and throughout *Germany*) at the first was communicated and made known unto the Souldiers by the common Executioner of that place.

If you enquire into the reason hereof; they first of all pretend experience, and they alleadg likewise great persons Princes and worthyes, who have by their Experiments found the truth hereof, and so have left it unto us as a *Probatum*, that any one may in this manner and by this means render himself inviolable and so as not to be hurt by any kinde of Weapons. And moreover, some there are that derive the virtue and Cause of this effect from the Constellations; and therefore it is that they teach us to make those Seals (which they cal *Periapta* and *Pentacula*) under certain Constellations.

But in very truth, we deny not this indeed, that such things as this may thus be done, and that they have been made use of by great persons, (Princes and others:) but the Question is now touching this, whether such like practises as these may be wrought by any Natural means; and whether a Christian Man

Man or Woman may lawfully and without Impiety in this manner render himself inviolable and impenetrable; or else whether or no whatsoever shall be done in this kinde be not done by Magick and the Diabolical Art, and by a compact with the Devil; and so therfore that it is altogether unlawful, impious, and wicked, for any one in this manner to make his Body impenetrable.

Thus to do simply unlawful:

In which Question we indeed defend the latter opinion; and we positively assert, that all the power, virtue and efficacy of the Means aforesaid proceed from a compact and agreement with the Devil, and so consequently from the Devil himself; and thereupon that he (whosoever he be) that shal by this kinde of Means endeavour to fence and guard his Body against the violence of Weapons, shall by thus doing attempt a thing altogether impious and unbefitting a Christian. For First of al, most certain it is, that there is no such virtue either in Metals, or in sheets of Paper or Parchment, of themselves and in their own Nature; but that they perform whatsoever is done, as they are marked with the aforesaid Characters. But now there can be no such virtue or efficacy in Figures and Characters: and therefore it will necessarily follow, that it proceedeth from some higher power; and this must be either from God, and the good Angels; or else from the Devil, that wicked Spirit. But it is no where extant in Holy Writ, that ever God did (either by himself, or the Ministery of the good Angels) work any such thing; or that he ever promised so to do. And who is there that can beleeve, that such an abuse of sacred Words, and other such like superstitious practises as have been before related, should be approved of by those good Angels: and therefore we must beleeve that they proceed from the Devil. And thus the Devil that he may seduce and withdraw men from the Worship and Service of Almighty God, and devote them unto himself, he maketh an Agreement and compact with any one that will hearken unto him, that if he wil forsake God, and become his, he will then make him free and inviolable from the violence of all Weapons whatsoever, so long as he shall carry about him such like Seals (or *Periapta* as they are commonly called) or shall devour the aforesaid Characters inscribed upon Paper. Unto which Compact they render themselves Obnoxious, and give their Consents, who ever they be that make use of the above mentioned Characters. For those Characters are the Devils Alphabet (if I may so term it) and as it were the Military pawn and Engagement by which he knows and acknowledgeth them, when they implore his help and assistance. For albeit there are some who here conceive themselves to be altogether free from all Idolatry, superstition, and impiety, and that they have herein no compact nor commerce with the Devil; yet nevertheless they are herein greatly deceived, so long as they make use of Means that were never ordained by God, but such as are of the Devils Institution.

Reasons proving the unlawfulness of this Practise:

A Compact with the Devil twofold:

For there is a twofold compact with the Devil, to wit, Mediate, and immediate; or explicite, and implicite. The immediate and explicite is, when any one shall make use of means immediatly delivered into his Hands by the Devil himself. But the Mediate or Implicite Compact is then, when any person shall make use of such means as were at first prescribed by the Devil, but yet such as he hath not received immediatly from the Devil himself, but hath had them by others and from Hand to Hand delivered unto him. Both which we finde forbidden, and contrary to the Law of God, which forbiddeth us to have any other Gods. Neither is it any whit to the purpose, that which many object, when they say, that it is no way probable, that compacts which others have entered into with the Devil, the guilt thereof should become theirs, and bring them under the like impiety; seeing (saith they) that it is the consent of the Covenanters that makes the compact: for in that Compact implicite or Mediate (as I have said) the consent is not altogether wanting. For whereas every one that hath but so much soundness of minde yet left him (*that he knows how to shun Rocks and avoid the pit that stands wide open, and ready to devour him*) will easily acknowledg, that those Characters or Words have no such virtue in themselves; and therefore before ever he make use of them he ought to inquire, by what power and virtue it is that they perform what they do. Which if he neglect to do, he then implicitely enters into a compact with the Devil, who hath made that promise that he will perform this for such as shal make use of those Characters and form of Words according to his prescription; and so consequently such a one cannot at al be free from impiety. And that this is a truth those two Histories following will sufficiently make good. *Martinus del Rio* in the 2. B. of his *Magic. Disquisition. Quæst.* 27. *Sect.* 1.) relateth of *Henricus Cornelius Agrippa*, who having at *Lovain* a youth boarding in his House that was over curious and prying, it so came to pass, that during this

this youths abode with him, *Agrippa* having at length occasion to ride a Journey far from his home, he delivered the keyes of his Study unto his Wife (whom he afterward put away by divorce) with this prohibition and charge that she should not suffer any to enter thereinto in his absence. But this youth having by his importunity and earnest intreaty gotten leave to go into the study, and lighting upon a little Conjuring book, while he was reading therein, lo a knocking at the Study door; but he persisting stil in his reading there is another knocking heard at the Study door, which the youth still reading on and not answering, the Divel entereth in, and asketh wherefore he was called; at which the youth being astonished and so far affrighted that he could not make any ready answer, the Divel immediately choaked and strangled him For as he that readeth any thing in an unknown Language, he himself haply may not understand what he reads which yet one that standeth by may understand; so it was here; although this youth knew not that he called for the Devil; yet notwithstanding the Devil wel knowing his own watch-word, and the engagement or Compact he had entered into, soon came upon calling.

The other History we have related by *Henricus Brucæus* (in the *Miscellanies* of *Smetius*, *B.* 5. *Epist.* 17.) which he tells us that he received from *Doct. Nævius*; and that the truth of this History was there confirmed by many of the Citizens. At *Leipswich* a little Girl not understanding what she did by reason of her Childishness and want of Age, whilst she was imitating all the Actions carriage and behavior of her Nurse (which she had seen her oftentimes use in the raising of storms and tempests) causeth thunder and Lightening, by which a village not far distant from this City was set on fire. The little young Girl being brought before the Senate, it was there with much deliberation debated whether they might legally proceed against her. But it was decided by the opinions of all the Counsellors there present, that they could no way proceed against her, neither punish her, by reason of her nonage, and ignorance of what she did. Which History doth sufficiently teach us that any one may even unwittingly, incautelously, and almost without his consent, cast himself into such a like compact with the Devil. For when as the aforesayd Girl (although by reason of her tender Age she understood not what she did) made use of those Ceremonies that were delivered and prescribed by the Devil unto the Witch her Nurse; the Devil was presently ready at hand, according to the Compact betwixt them) and raysed the aforesaid Tempest. Which if any one of a riper age (which might easily understand, that in these kind of Ceremonies themselves there can be no such power and virtue) had done, such a one (without doubt) had not been acquitted by the Counsellours, nor gone unpunished by the Senate. And therefore we conclude that there is none (unless he be out of his wits) that wil make use of the means aforesaid; seeing that he may easily understand that such like Ceremonies, Words, and Characters, do not perform those things they are sayd to do, either by any Natural power and virtue of their own, or else by any power given them from God, or the good Angells, but that they have this their power from that wicked spirit. And he whosoever he be that shal make use of them cannot be acquitted and freed from gross impiety, Magick, and Idolatry.

Whether there be any virtue in the seals.

But whereas there are some that endeavor to derive these virtues from the Constellations; (and therefore teach how to make divers of these Seals under some certain position of the Stars; we are therefore in the next place to examine that opinion also.

And the very truth is that among all the Seals of *Arnoldus de villa Nova*, and of *Paracelsus* (in his *B. Archidox Magic.*) there is none at all to be found that wil render a man inviolable, and so as not to be hurt by any kind of Weapons; and therefore this invention of the Devil seemeth to be newer and since their times. But now in regard that there is one and the same reason for all those aforesaid effects (that are promised from these kind of Seals) we conceive it therefore very fit to speak something, in the General, touching the aforementioned Seals. For if we shall (in the general) demonstrate unto you, that these Seales have in themselves no such natural virtue or efficacy, we shall thereby withall shew unto you, that these Seals likewise (that are made use of against Wounds) have not their virtue and power from the Constellations.

Magick.

That under the name of Astrology such like Magical Trumpery should be exposed to sale, is no new thing; for it was of old thus wont to be done in the Eastern Countryes. Touching which *Pliny* (*in the* 30. *B. of his Natural History, and Chapt.* 1.) *sayth thus. Magick that most fraudulent of all the Arts hath very much prevayled all the world over, and that now of a long time, & for these many Ages.*

But

But indeed there is no cause why any should admire at this the so great authority of Magick: in regard that she alone of all the Arts, adding unto her self and comprehending within her self three other of the most famous and sovereign of them (and such as have the greatest command upon the mind of Man) hath reduced them into one only, to wit, her self alone. For first of all there is none that doubteth and that wil not readily grant, that she hath her birth and original from Physick, and that she so crept in under a fair and specious pretence of safety and health, as a higher and more sacred Art then Physick it self. And so hath she likewise by her blandishments and large admirable promises added unto her self the strength and power of religion; with which now a days mankind is so strangely blinded. And that she might the more easily suggest these her promises, she intermingleth the Mathematicall Arts; there being none that is not very greedily desirous to know things future as concerning himself; verily believing that these things are fetcht and brought unto him from heaven it self. And thus the senses of Men being possessed, and lying under a threefold Obligation hath increased and grown up unto so great a heighth, that even at this day it is very prevalent in most Nations; and in the East especially it hath a commanding power over such Kings as have Kings for their subjects.

And I could heartily wish that the said superstition had there only had its residence and abode in the Easterly Countryes; and that Monarchy there perishing, she had likewise perished together with it. But afterwards this superstition became propagated likewise into other Regions. For even *Galen* also (in his 9. *B.* of the *facult. of simple Medicam. in his Chapt. of Stones, & the Jasp.* telleth us that it was a very usual custome even in his days to ingrave a Dragon upon the Jasper stone, and to set and wear it in rings for the comforting of the Stomack. And *Alexander Trallianus* (in his tenth *B.* about the end) writeth, that they were wont to carve upon the *Jasper* stone the effigies of *Hercules* standing upright, and killing the Lion; and this they set in a Gold ring, and wore it for the Curing of the Collick. And in the same place, he commendeth as a thing sacred and not to be communicated but unto sacred Persons, this Ring, against the Colick. On the seventeenth or the one and twentieth day of the Moon, he appoints us to take a Ring of Iron, and to make the Circle thereof eight-angled; and upon the Eight Angles to inscribe these words, *fuge, fuge, heu bilis: a'auda quærebat.* And this Sign or Mark following, he commandeth us to write upon the head of the Ring. And in his tenth *Book*, and *Chapt.* 1. against the Gout in the feet and toes, he commendeth a thin plate of Gold, in which (the Moon then being in *Libra* or *Leo*) is to be inscribed that verse of *Homer*: πτερὸν χεὶ δ' ἀγορὰ ὑπὸ δ' ἐσονάχιζετο γαῖα. And many more besides of this nature we likewise meet with very frequently in *Trallianus*. And *Paracelsus* hath also propounded very many of these like Characters, (in his Book *Archidox. Magic.*) And yet nevertheless he himself (in his *B.* of *occult Philosoph.* in the *Chapt. of Characters*) before all other Characters, Signs, *Pentacula*, and Seals, he preferreth two of them: one, that wherein (in a certain figure there is inscribed the name *Adonai*. The other is that in which likewise (in a peculiar figure) there is inscribed the Tetragrammick name of God, consisting of five syllables. And he writeth that these seals are very useful and avaylable against al Devills and also against all Charms and inchantments, and that they perform things wonderful and admirable. And therefore again I wish heartily, and I would to God that the sayd superstition which hath had a commanding power over great kings in the East who have had even Kings for their Subjects, had not likewise born too great a sway over Christian Princes, Nobles, and great persons; or that there were not found to be such as sold unto these Princes & Nobles those Magical Charms and spels under the name & pretence of Astrologicall Rarities: and likewise that these great persons would more diligently inquire into those preservatives when they are profered unto them: for they might easily find and discover that those things had not so much as any probability of Reason to ground upon. For although some have endeavoured to derive the cause of these effects from the Heavens; yet notwithstanding as for the manner how this is done, therein they agree not; neither do they bring any thing of probability to prove the same.

The Reconciler (*Difference* 101) from that of *Ptolomy*, (in his *Centiloquy*, *that the faces of sublunaries are subject unto the Celestial Aspects*, that is to say, the species of the Living Creatures of this inferior world are subject to the Cælestial images,) concludeth and positively determineth, that the Cælestial sign *Scorpio* hath the predominance over al inferior Scorpions, and the Serpent over all Serpents here upon Earth.

But grant indeed that it be so, (which yet Nevertheless they have no way proved) that these inferior Earthly Scorpions are subject unto the sign of the Scorpion in the Heavens; yet what is all this to the Scorpion carved and engraven upon the precious Stone? Certainly a Dog, or Scorpion, engraven or pictured, is not of the same kind, nor under the same *Genus*, with the living Creature,

Dog,

Dog, or Scorpion. There are others that say that this virtue is instilled into these Seals from Heaven and the Stars; and that the Astral Spirit that hath its influence and is sent upon them, doth not only accommodate it self unto those Metals, precious Stones, and those plants; but that it doth likewise secretly intermingle it self even with their very substance; and that in the very first Creation it obtained a Mutual and Sympathetical consent with them, then a Familiarity, and Lastly, soon after a Continuation also with them.

But let it indeed be granted, that the Heavens and the Stars do not only (as *Erastus* will have it in this Quest. *Part* 1. *Disputat. against Paracelsus, Page* 151.) warm these inferior Bodies, and enlighten them, and that in this manner they do (as a Common and general cause) at all times produce one and the same effect in all things here below: but let it likewise be determined, that there are some certain peculiar Stars that work upon these inferior Bodies by their secrets and occult influences, and that they do peculiarly affect those things with which they have the aforesaid familiarity; and that one Star hath a familiarity with the Adamant, another with the Rose, and a third with some other Plant: But I pray, what maketh all this for the engraving and inscribing of Figures and Characters, seeing that the Stars communicate their virtues unto things here below in a meer Natural way, without any prescript or Artifice of ours? And wherefore do not the Stars and Constellations infuse those their virtues equally and indifferently into Metals or precious Stones, whilest they are whole and entire, and before they are engraven and inscribed with any Characters, as they do afterwards (if these men speak truth) into those that have such like Characters Carved and Engraven upon them? And certain it is, that *Pæony* gathered at such a fit season of the year, as also other Plants, and all things else whatsoever that are made use of instead of Natural Amulets, do put forth their virtues; (and so likewise the Loadstone draweth the Iron, and is moved unto the Pole) without any kinde of Figure, or Character engraven thereon. And hereupon *Galen* rightly determineth, that the *Jasper* stone hath the very same virtues, whether the sign of the Scorpion be carved upon it, yea or no.

And *Henricus Cornelius Agrippa* seemeth to differ but very little from this opinion, who in his 1 *B. of occult Philosoph.* and 33. *Chap.* thus writeth touching the thing in Controversie: *All the Stars* (saith he) *have their own proper Natures, Proprieties, and Conditions; the Signs and Characters whereof they do by their Raies and Beams produce likewise even in these inferior Bodies, to wit, in the Elements, in pretious Stones, in Plants, in Animals, and their Members. Whereupon it is, that every thing whatsoever from its Harmonical disposition, and from its own Star Iradiating and Darting its Beams upon it, obtaineth some special Sign and Character imprinted upon it, that is significative of that Star or Harmony; and containing some special virtue in it self, differing from others, either in general, or in special, or in the number of the matter præexistent. Every thing therefore hath its own Character imprinted upon it (for the working of some peculiar effect by its own Star, and especially by that which above all other things hath the sovereign power and predominance over it: and these Characters contein within themselves, and so also they likewise retein these proper Natures of their own Stars, as also their virtues and Roots; and they produce the like operations with them on other things upon which they are reflected: and they also draw forth and help forward the influences of their own Stars (whether Planets, or even fixed Stars also, and Celestial signs, and Images) to wit, as often as they are wrought and fashioned in a due and fit matter, in their own due and proper time, and with due and fitting Solemnities.* And there he also delineateth very strange and admirable letters and Characters, proper and peculiar unto each of the Planets. And therefore if any one desire and seek after the virtues of any Star, the thing that is subject unto that Star is to be engraven upon somwhat that he wears about him. As for instance, if any one desire to have the virtue and influence of the Sun, let him then take Gold and engrave upon it the Character of that Planet, at that very time when the virtues of the said Planet are most strong and vigorous. But these are all meerly grounded upon a false supposition; whereas they take that for granted which indeed was never yet by us, neither will it ever be granted unto them. For first of al, *Agrippa* and others do attribute unto these Seals many such like virtues (as we may see frequently in divers places of their Descriptions) which in very truth cannot be the Natural virtues of any Star. And *Paracelsus* (in the fourth *B.* of his *Archidox. Magic.*) teacheth us how we may make a Bodkin, and paint and inscribe upon it certain Characters; and then he affirmeth that if any one shal with Chalk make a circle against a wal, and in the very Centre thereof fix the sayd Bodkin, all the flies neer that place wil come and sit upon the sayd Circle, and there remain until such

time as the Bodkin shall be again pulled out of the Wall. But let *Apella* the Jew believe this, for indeed I shal not.

And yet notwithstanding there are at this day those that do not only believe this, but endeavour likewise by their publique writings to perswade others hereunto; and these conceive that this virtue is by those Characters derived from the Constellations. But let them shew us what Star it is that hath this commanding power over these Flies. *Beelzebub* is indeed called the god of Flies. And without all doubt these poor Flies are more likely to obey his Commands then the Stars. There is Another who tels us how we may make a Seal with the Figure of old Father *Saturn* digging up the Earth with a Spade (which, say they, ought to represent unto us the Planet *Saturn*;) and this Seal if any one shall carry about him in his left Boot, (and why not. I pray, as well in his right Boot, or on his Arm?) he writeth that it will then so preserue a man, that he shall suffer no hurt at all from his Horse; and moreover that it wil speed and hasten the hard labor in Childbearing Women.

And moreover how and from whence will they be able to prove that these strange and uncouth Characters (that are to be seen in *Corn. Agrippa, Paracelsus*, and others) are the Characters of certain Stars? And not Characters only, but even other Figures also. They paint *Saturn* in the likeness of an old man, with a Pruning Hook, Sythe, Spade, or Plow-share. They paint or Picture *Jupiter* like a King with a Scepter in his Hand. Now what agreement is there between these Figures and those Planets which they Represent? And what, I pray, may the Reason be, that the Planets communicate their virtues and influences unto Metals, only if they be engraven and inscribed with these Figures, and not with others? And who was the first that taught us, that this Star taketh a delight in this kind of Character, and that Star in another kind of Character different from the former? And the Reason is the same for al other Figures; touching all which they ought to prove unto us, that these are the Figures of certain Stars. And moreover, besides these Characters, what mean they by so many Words, which they not only pronounce in the framing and fashioning of these Seals, but they are likewise engraven and imprinted upon these Seals; as we may see in *Paracels.* his *B. Archidox. Magic.* and in the Seals of *Arnold. de villa Nova.*

But others there are that endeavour to free themselves, and clear the controversie, by saying, that individuals when they begin to be under some determinate Constellation, they then receive a certain admirable faculty (of operating, or of suffering) over and beside that they have in special, or from the species. But let this be granted; yet notwithstanding it cannot be said, that the precious stone, or Metal, do then begin to have their being when they have these Characters engraven upon them; for they were, and had their being before; and indeed their substance was likewise individual; and according also to their own opinion, the Attral Spirit & virtue insinuateth it self into that substance wherewith it hath a Sympathy. For there is, to wit, between natural substances themselves a cerrain occult and secret familiarity and Sympathy; but yet no such thing between Natural Substances and Artificial Figures.

But others are of this opinion, that the Figure is not indeed the principle of operation, but yet notwithstanding that it conduceth very much unto the said operation. For the conception of a deformed Figure in the minde of Man or Woman, we see what sadness it produceth unto them; and on the contrary what Joy and cheerfulness the conception of a fair and delightful Figure and representation causeth in their Minds and Countenances. And by the Instruments of Artificers, according to the variety of the Figures, so are the operations various; some of them by the Saw, and some others of them by the Hatchet or Axe.

But neither is there any thing of weight or moment in this that they alleadg. For I demand, what Beauty or Deformity there is in these Images and Characters? And whereas fair things delight the minde while they are seen and looked upon; how (I pray) can these things delight the mind of a Man when they are carried and worn about him covered and seldom look'd upon? And what do those various Names, (and indeed oftentimes such as are altogether unknown to us) confer and add unto the fair and pleasant conception before mentioned? And as for the Instruments of Artificers, the Figure indeed maketh much unto the operations which are by a local motion; but nothing at all unto those operations that are wrought by alterations: for in these the Figure doth nothing at all, neither can it: and precious Stones if they have any natural virtues at al in them, they put forth these their virtues under any Figure whatsoever it be. And *Galen* writeth as touching the *Jasper* stone, in the *place above alleadged*, that he himself had found by experience, that the virtue thereof was stil one and the same, with, or without the Figure of the Celestial Dragon, or the sign *Scorpio*.

Neither

Neither yet are there any other that hitherto have been able to bring any the leaſt ſhew of probability for the virtues of theſe Characters and Seals. And how indeed could they poſſibly render any Reaſons, and give us the cauſes of ſuch their abſurd Tenets; whenas they write, that theſe Seals do not only expel and drive away Diſeaſes; but that ſome of them wil likewiſe make a Man gracious unto al Men whatſoever; and that others of them will procure for a man knowledg, Wit, and Memory; others the favour of Princes; others victory in War, and Civil Cauſes; others good fortune (as they cal it) in Hawking, Hunting, Fiſhing, and Merchandiſing; and that others wil make friends to ſtand faithful unto them; others advance a Man unto the higheſt Honors and preferments; and that there are ſome of theſe Seals that wil make a Man Maſter of his wiſh whatſoever it be; and I know not what other things that theſe Seals are able to accompliſh for him that weareth them? *Rodolphus Goclenius* (the younger) taketh here a great deal of pains, and troubleth himſelf exceedingly (in his *Magnetick Synarthroſis*) and at length he diſtinguiſheth between theſe Seals; and thoſe whoſe Authors are ſaid to be *Ragael, Chael, Terel, Hermes, Salomon*, theſe he rejecteth: but there are others of them that he commendeth, to wit, thoſe Seals that are framed and faſhioned under ſome certain poſition and concourſe of the Stars, and receive naturally all their virtues from the influence of theſe Stars, and from the Connexion and Continuation of the Natural Cauſes; without any impiety, or Superſtition at al. But now what this Connexion of the Natural Cauſes is, and in what manner theſe Seals and Images receive their virtues from Heaven; theſe things he no where telleth us; neither doth he ſufficiently explain himſelf; only he ſaith indeed that theſe things are very clear, and ſufficiently manifeſted by Experiments. But the very ſame may be ſaid by *Chael, Ragael*, and the reſt of the Magitians, in the behalf and for the Juſtifying of their Seals alſo. And who is there that now adaies knoweth not, that even by ſuch like Seals very many have been made inviolable, and not to be hurt by any Weapons? And therefore the Queſtion is not here, what may be done; but the Queſtion is only from what agent theſe things are performed; and whether by a Natural Cauſe, or by the aſſiſtance of the Evil Spirit.

But now unto any one that ſhal accurately and exactly and without any prejudice weigh and conſider the whole buſineſs, it wil very eaſily appear, that theſe vertues and effects cannot proceed from any Natural Cauſe. For two things there are in thoſe Seals, the matter it ſelf, and the Characters engraven upon it; unto neither of which this virtue can be aſcribed: for the matter is from Nature, and hath in it no ſuch virtues: and this they themſelves ſee a neceſſity of confeſſing.

And here therefore for the proving of the efficacy of theſe Seals, they betake themſelves to Amulets, and pretend the virtue of them. But be it ſo indeed, that all things whatſoever are written touching theſe Amulets are true, (as moſt certain it is that very many of them are;) yet what is all this unto theſe Seals; in which if we conſider the Metals, Characters, and the like, it is without all doubt, that thoſe things have in them no ſuch virtues. And *Pæony*, the *Hoof* of the Beaſt *Alx*, and the like, do ſhew and put forth thoſe virtues that they have, albeit there be no Characters at all engraven upon them: and the like alſo *Galen* (in *the place before alleadged*) tels us that he himſelf had by experience found to be true of the Jaſperſtone.

And then as theſe Seals have not their virtue from the matter; ſo neither from the Characters, that are from the Artificer; and cannot have any ſuch virtues, either from the Artificer, or from themſelves. For why, theſe Characters are from an Idea in the minde of the Artificer, which doth not work any effect upon things external, And of themſelves they are nothing elſe but Figures. But now there is no power nor efficacy at all in Figures for the working any effect, in regard that they are nothing elſe but only qualities of a quantity. For all virtue and power of acting is principally from ſubſtance; which by its qualities is efficacious and operative. Action is between Contraries of the ſame kinde, and ſuch are not Natural and Artificial; among which are theſe Characters. Neither do things Artificial work upon things Natural, nor alter or affect them as they are ſuch: but they Act and work upon them as they have a Natural matter. And ſo on the contrary, things Natural do not Act upon Artificial things (by altering or affecting them) as ſuch, but as they conſiſt of a Natural matter. And therefore Images or Names engraven upon matter can of themſelves perform nothing; and the matter if it be at all affected by the Heavens, is equally and as much affected if it hath not any Image or Figure at all engraven upon it: and as for Characters, Figures, and Words, engraven upon the mater, they have in them no peculiar virtue of receiving the Influences of the Cæleſtial Bodies; neither can

they give any such virtue unto the Matter.

The truth is that *Rodolphus Goclenius* the younger doth indeed endeavour to give an Answer unto this objection; whilest (in his *Magnetick Synarthrosis, page* 101.) he thus writeth: *It is not the Statue* (saith he) *as a Statue, neither yet the Seal, nor the Image and figure, as such, that can affect any other Statue or quality. For the very truth is, that these Artificial Seals do acquire no virtue at al from Art; but the virtue is instilled and infused into them from Heaven, and the Stars. I say again that this same Celestial Ray, and Astral spirit that is sent down hither, and here hath its influence, (in this sublunary world) doth not only Accomodate it self unto the Metalls, Stones, and those plants aforesaid; but doth likewise secretly and imperciptibly insinuate it self into their very substance; with the which (even from the very first Creation) it hath obtained a Mutual and sympathetick familiarity, connexion, and continuation. But now this spirit hath its influence without any adjuration, Consecration, and invocation of Devills; but altogether in a Natural way.* But all that he answereth is nothing worth. For this is that very thing (according as it is in the Question) which he ought to prove, to wit, that upon Metals, and papers, ignorantly engraven and Lettered, there can any such like virtue (as is attributed unto these Seals) be derived from heaven, and the Stars. For although we do not deny, that the Stars have their secret influences upon these inferiour bodies (and therefore he hath taken much pains to very little purpose in proving of it,) to wit, that the Stars do act upon these inferior bodies not only by their motion and light, but also by their occult influence: yet nevertheless, two things there are especially of which there is great question to be made. The first is this, whether the Stars have in them any such virtue of producing fortuitous Events, and meer casualties, and such effects as are not Natural but wholly depend upon the will and good pleasure of Men. And the other is this, to wit, why they do not communicate those their influential virtues unto Metalls as they are of themselves, but only unto such of them as are engraven with Characters. For what have those Characters to do with the Stars? And what hath *Mars* in the Heavens to do with the image of an Armed man? Or what hath *Saturn* to do with an old man holding the plough? And so of all other the Planets.

And the very same is likewise to be sayd (the case standing al one) touching the signs of the Zodiack, and the rest of the Asterisms unto which Names have been given by Men according to their wills and pleasure; (for the teaching and instructing of others in the grounds of Astronomy) who could (if they had so pleased) have given some other names unto those Asterisms, which we now from them call, *Pisces*, or *Sagitarius*. Like as the Hollanders, even in our Age, have most freely (and according as they thought good) imposed names upon all those Meridional signs that they observed in their Navigations to the Southerly parts. And so the signs and figures likewise (denoting those Asterisms,) have been imposed according to the wills and fancies of Men: and therefore we conclude, that there is no Necessity at all why the virtue of any Star should insinuate it self into any such Character as is imposed meerly by the wil and fancie of Men, although it be engraven, and inscribed at such a certain time, the Star being then in such or such a position.

And therefore the whole controversy at length returns to this, that from a Naturall Cause there can no such virtue be ascribed unto Seals and such like Characters: and if there be any, (for of this very thing there is great doubt to be made; and many things without question are much talked of and boasted, which indeed were never yet experimentally found to be true) as *Paracelsus*, *Arnoldus de villa Nova*, *Thurneiserus*, (and other of our more Modern Authors) produce many things to this purpose; I say if any such efficacy be found in them, it is to be ascribed either to the imagination, (for there is none that knoweth not, that the power and strength of the Imagination is very great, and almost incredible) or else if it be not so; then of necessity it must depend upon some supernatural cause; that is to say indeed upon wicked spirits, who by such like Characters, as by certain signes, are tacitly invited and called unto, by virtue of a former Compact they had long before entered into with his Servants that engaged themselves in a League with him. For these things have their original from the Gentiles that were extremely addicted to superstition and Idolatry: and those wicked spirits made and framed unto themselves such like Seals, and Characters, to serve instead of Military pawns and pledges. And therefore they avayl from that Compact (whether explicite or implicite) to wit, that which the Devil entered into with that person who first received and suckt in this Discipline from him. Now the Devil doth this, to confirm and establish the compact, and the superstitions constituted by himself; and that he may ingraft them into the minds of Men; or else being ingrafted that he might confirm and propagate the same; and so by this, as by all other means, with-

draw

draw man and hurry him away (unto himself) from God his creatour, and from those Means by him created, and ordayned for the safety and welfare of Mankind. And therefore these things (and al other of this nature) are nothing else but certain owls or the Devills Night-birds, with which he useth to hawk for the souls of Mankind. And therefore it is by no means to be endured, what *Phedro* writeth (in his *Chirurgia minore*) that in such Characteristick Cures there lie concealed greater and more miraculous Secrets of the First Fathers and the Ancient Prophets, then is fit for us to express and discover unto others. The rash bold Man ought first of all to have demonstrated that this so great a virtue is either by God and Nature, or else by Art, put upon these Characters and constellated words (as he calls them ;) then so to have raged and railed against other Physitians, terming them (as he doth) blasphemous, and men of an ill conscience, so to detract the honour from God in these his highest and miraculous operations of the Characteristick Cure. He honoreth God who contemplateth, admireth, and Celebrateth the works of God, such as are by him created, and as they come forth of his hands. And he may truly be sayd to be injurious against God, and impious, who attributeth unto any of his Creatures those virtues which they have neither received from God, nor yet from Art.

And as for those first Fathers, and the Ancient Prophets he speaks of, who (as he writeth) used this Characteristick Cure, they are not those of whom we find mention made in holy writ ; for it cannot be proved by any Argument that these ever admitted of any such superstitious practises: but they are those that we find mention made of in *Ascelpius Hermes Trismegistus*, in these words *Because* (saith he) *that our Fore-fathers erred much against, and walked contrary unto the command of the Gods, (incredulous as they were) and not heeding Divine worship, but sleighting true Piety and Religion, they invented an Art by which they might have Gods unto themselves ; unto which when they had invented it they adjoyned that fit and convenient virtue that proceedeth from the very soul of the World, and this they mingled with the said Art. And because they were not able to make Souls, calling forth the Souls of Devills, or Angels, they conferred these upon their Images, and their Divine Mysteryes ; by which these their Idols alone might have power and might of doing good or doing Evil unto others, as they thought good.* And al others who have approved of those Characters, & defended them have been very much addicted unto the damnable art Magick, and unto all kind of superstitious practises ; to wit, the *Platonists*, (the most Studious & devout Worshippers of Devills) *Cornelius Agrippa, Paracelsus*, and others the like, very much suspected as touching this infamous Magick. Neither doth this any thing avail them, to say, that such things as these may be done, without any invocation upon the Devil, and adjuration of the Wicked spirits, and by other unlawful Means ; and that they may be wrought by a Natural power. For first of all they were to prove that these have within them those peculiar virtues that Metalls and precious stones of themselves have not ; which unless they can prove we may truly conclude that they make use of unlawful means, and such as were never ordayned by God, nor propounded by Nature for our practise. And moreover, though there appear no immediate compact with the Devil, nor any explicite Conjuration, at the present ; yet Nevertheless there may be for all this (and questionless there is) an implicite compact with the Devil ; who very well knows and is ready to acknowledg those his pawns and engagements (as it were) once given and appointed unto his followers and Worshippers. And who is there of all these who would defend these Seals from the suspition of all superstition and Idolatry, that can explain unto us what these strange and wonderful Characters (and as *Apuleius* termeth them) so lettered that they cannot be understood, and those unknown Words, which appear in the Seals that are propounded by *Paracelsus*, (in his *Archidox. Magic.* & elsewhere) signify ; or that dares pass his word, and engage his faith upon it, that these figures and unkown words are not the Devils pawns and assurances by which he obligeth unto himself his worshippers and votaries ? A German understandeth not what is written in the Turkish Language, but a Turk doth ; as likewise neither doth a Turk understand that which is written in the German tongue, which yet a German doth. And so although it be not every man that understandeth these strange uncouth Characters, or knoweth what to make of those never heard of words (not to be understood) yet notwithstanding, the Devil (as the Author of that Alphabet and writing,) understands them very well ; and accordingly being by these invocated, and called upon for his assistance, he readily affordeth the same unto the utmost of his power. And therefore, let any who so pleaseth esteem of these wales & practises, & account of them as highly as he listeth ; but as for my own part, I shall endeavour to keep in mind that first and Chief command of God ; to wit, *Thou shalt have no other Gods.*

And

And therefore seeing that from what hath been said it clearly appeareth that there are no Natural virtues in these Seals and *Periapta*; it is even from hence manifest, that these things cannot possibly render a man inviolable, and so as not to be hurt by any Weapons of War: and for this cause we have been the more large in the handling of this Controversie; and at length conclude with this, that whatsoever is attributed unto them they have it not either from Heaven, or from any other Natural Cause, but that all this is nothing else but the meer invention of the Devil; and that therefore it cannot be made use of without Idolatry. For God so formed and fram'd the Body of Man, that it should be soft, and sensible of pain, and the solution of Unity; and therefore whosoever he be that would dispose and make it otherwise, he opposeth himself unto Gods order and intention, and useth the Devils help and assistance therein. For the Cause of this effect is altogether to be referred, either unto Nature, or unto God, or unto Men, or unto those means that are administred; or else Lastly, it is to be ascribed unto the Devil. Unto Nature it cannot be referred; for she hath formed unto Man such a Body, that it may be violated by any kind of Weapons. Neither can this effect be attributed unto God, who without a Miracle doth not change the order and course of Nature. Neither doth it appear from Scripture, or any sacred History, that ever any such thing was done by God: although that (by his own command) his people have oftentimes waged most dangerous and difficult Wars against divers of their and his enemies. Neither can any such effect proceed from Men, who (as it is very well known) have no power as of themselves to perform any such thing. Neither likewise, if we consider those means, have they any power in them any way whatsoever to produce such an effect, and to invert the order of Nature. For they are either Characters, or words, or some such like thing, unto which no such virtues were every yet given and granted either by God, or else by Nature. And therefore it cometh al (at length) to this, that such things as these are performed by the help and assistance of the Devil. For albeit there are many who think that there passeth no commerce at al betwixt them and the Devil, although they shall make use of such means: yet notwithstanding these ought to know, that such means as they (first of all) have no warrant from God, so neither were they invented by Men, but suggested unto those persons (even by the Devil himself) who at first entered into a league and Covenant with him; and therefore they are to know, that all those that make use of them do make themselves partakers of this compact, as we have often said before.

And that the evil and wicked Spirit doth meerly Cheat and delude men by these *Periapta* appeareth even by this, that when men have thought themselves by this means, and in this manner, sufficiently fenced and guarded against the violence of all kind of Weapons; there were others found that were able to Nul, Dissolve, and quite take away that inviolability, as they term it, and proof against the force of Weapons; and so when they least of all look for or suspect any such thing, they perish in this their superstition.

And the truth is, the waies they have to uncharm the Body, and to render it penetrable by Weapons or Gun-shot, are for the most part (as they say) of very little weight or moment; but they are (I confess) unto me altogether unknown: and yet notwithstanding from the Relation of others (of the vulgar people) it plainly appeareth that those *Periapta* have no power of fencing and preserving the Body against bullets of Silver; as also that a mans Body cannot be made inviolable, if the Leaden bullet be but never so little chawed in the mouth: if the Swords point be heated in the Fire, and then anoynted with Sewet; if the Sword be run into the ground, or thrust into bread; and if many other such like things be done; in which to be curious is neither my business, nor intention. But this will most certainly from hence appear, that the Devil is a Lyar, and that he keepeth not the Covenant and Compact he entereth into with his Servants; but that he oftentimes Cheateth and Deceiveth them; and that when he communicateth that Art unto Men, he doth not this that he may benefit them; but only layeth Snares for their Souls, whilest he most of al pretendeth and promiseth the making of their Bodies safe from all manner of injuries. Of which there are extant many instances and examples; and among the rest, remarkable is that example which happened at *Misnia* in the Moneth of *February*, this very year 1634. For there (at *Misnia*) when as a certain Souldier (in his Cups) was boasting and making his brags (with that solemn, but yet now adaies too common an adjuration among the Souldiers, *Let the Devil fetch me*, or, *the Devil take me*) that he was inviolable, and impenetrable by any Weapons whatsoever; and that he might give them an experiment to confirm the truth of what he had said drew forth a short Sword, and therewith he violently smote twice upon his naked

Breast,

Breaſt, (inſomuch that the Sword was even bowed and made crooked thereby) and yet had no hurt at all by thus doing; but when he attempted to do the ſame the third time, then the Sword ſuddenly penetrated into his Breaſt, and pierced even unto his very heart; and ſo this miſerable wretch periſhed in this miſerable manner.

And therefore let every Chriſtian and pious Souldier be hereof warned that he make not uſe of any ſuch wicked and unlawful means (as being and proceeding meerly from the Devil) but that he content himſelf in the ſafe guarding of his Body by lawful Arts and waies; and as for all other things, let him commit them unto almighty God, who hath our lives in his Hands; and without whoſe will there is not one hair can fal from our Heads.

THE FIFTH BOOK, THE FIFTH PART.

Of Fractures.

Chap. 1. *Of Fractures, and the Cure of them in General.*

THat which in a ſoft part is called a Wound, the ſame is in a hard part, and bone, called a *Fracture*, (by the Greeks properly termed *Agma*, and *Catagma*) which is a diviſion or ruptrure of the bone, from ſome external Cauſe violently ruſhing and breaking in upon it. Now as for thoſe that have written at large and very accurately touching Fractures, they are (in the firſt place, and eſpecially) *Hippocrates* in his *Book of Fractures*; and *Galen* in his *Comment* upon the ſaid Book; and in his *ſixth Book* of the *Meth. of Curing*, *Chap.* 5. and 6. And among the more modern Authors, and thoſe of our own time, *Hieronymus Fabricius ab Aquapendente*, in his *B. of Chirurgery*, *Tit. of the Fractures of the Bones*; and theſe Authors you may have recourſe unto, for your more ful ſatisfaction in ſo weighty a point: in the mean time I ſhal endeavour briefly and plainly to Contract the whole ſubſtance of the ſubject in Hand, and ſo to ſet it before you.

The Differences.

Galen (in his *ſixth B. of the Meth. of Curing. and* 5. *Chapt.*) telleth us what theſe Differences are. For ſomtimes (ſaith he) the bones are broken tranſverſly; and then it is chiefly and properly to be termed a Fracture; but then indeed if the bones be ſo broken, that by no Art or means that can be uſed the ends and extreme parts of them may be brought and made to ſtick faſt together as before, and that they lie not directly one againſt the other, this kind of Fracture is (in ſpecial) called *Cauludon* from the reſemblance and likeneſs that it hath with a broken ſtalk. And *Paulus Ægineta* writeth that this *Cauludon Catagma* is likewiſe called *Raphanedon*, and *Sicnedon*, from the ſimilitude of a broken Raddiſh and Cucumber. But if the bone be not only broken into two parts, but that it be likewiſe ſhivered into many, that Fracture is termed *Suntrimma*, or *Comminution*; and by *Galen* it is alſo called *Caruedon*, becauſe that it is made after the manner of broken Nut-ſhels. But if the bones be cleft according to their length like as Wood is cleft, it is then called *Parameces*, that is to ſay, (properly) a right or ſtraight *Fiſſure* or Cleft; and by *Galen* it is termed *Schidacedon*. In the Head, this ſpecies of the ſolution of Unity hath names peculiar and proper unto it; touching which ſee *Hippocrates*, in his *B.* of the *Wounds of the Head*, and in his *firſt B.* of *Practiſe*, *Part* 1. *Chap* 23.

And of theſe Fractures there are likewiſe ſeveral other differences; for ſome of them are great, and ſome again but ſmal Fractures, ſome of them ſimple or ſingle Fractures, and all but one alone; but then another Fracture there is that is manifold, as conſiſting of many; ſome equal, others unequal; and the bones are alſo broken ſomtimes in one manner, and ſomtimes in another manner, and that very different. And the truth is, the Ancients gave them their names from the Figure and the likeneſs of other parts; and (as we told you before) they called them *Cauledon*, *Raphanedon*, *Sicnedon Catagma*; and ſomtimes likewiſe *Alphitedon*, when the bone is broken and ſhattered into many ſmal and thin parts, *not unlike unto Meal*; they cal another ſort of Fracture alſo *Calamedon*, that is to ſay, the *breaking of a Reed, eis Onucha, after the form of a Nayl.* All which Appellations notwithſtanding are for the moſt part ſleighted and neglected by *Hippocrates*, who inſtead of them hath made uſe of

Names

Names more ordinary and usual, as one rather desirous to interpret, and choosing rather by speaking of them in more words, so to describe them. And sometimes al the parts of the broken bone do again Joyn and grow together; but sometimes some one or other parts of the broken bone impostumateth and droppeth out.

There are likewise divers other differences, that are taken from the part affected. For one is said to be a Fracture of the Shoulder; another of the Arm, another of the Thigh; and so of the other parts. And then indeed in the Arm, either but one of the two bones, or else both of them (to wit, the *Ulna*, and the *Radius*, bones) are broken. And in like manner it is also in the Thigh, the case being one and the same. The bones of the Nose are likewise broken; and so are also the Channel bones, the Ribbs, and the whirl-bone.

And there are moreover (besides these) other differences that are meerly accidental; when as a bone broken either abideth stil in its own place, or else is carried forth thereof, and lifted above some other bone; and that sometimes the Fracture is but newly made, and sometimes it is old, and of a long continuance. And there are also other differences, that are improperly so called; as that a Fracture is conjoyned sometimes with a Wound, sometimes with a Luxation or disjoynting, and sometimes with other affects. For sometimes there is a Fracture made, the Skin and Flesh lying above it stil remaining sound and whole; and sometimes these happen likewise to be hurt and wounded. And sometimes also together with the Fracture there happeneth a loosening of the Joynt neer unto it. And sometimes unto a Fracture there happen an extraordinary pain, a swelling, and an Inflammation: but sometimes again, there are none of al these joyned with, or following upon the Fracture.

The Causes.

Now all things may be said to break the bones, that so endeavour to bow and bend them, that they (being not flexible) must necessarily be broken. *Galen* (in his *second B. of Fractures*, and *Text* 9.) reduceth them all unto four Causes, whiles he writeth after this manner: *It is either something* (saith he) *that can bruise and batter, if it be laid on with great force and violence (and this without doubt ought to be some Body that is hard of substance, and heavy in its weight:) or else it is somwhat that doth not only divide the Skin, or that divideth likewise something that lieth under the Skin, even unto the very bones, but which divideth also the very bones themselves: which Malady* Hippocrates *himself indeed calleth* Edra, (*that is to say, a* Decession) *in his* B. of the Wounds of the Head. *And moreover also some by leaping from an high place have broken either the Ankle or the Thigh bone; which in these persons were drier, and not so thick perhaps as in others. For I my self also have seen in the common wrastling, when in the turning of a man round a Fracture hath happened unto him, who having hereby had his Ankle together with the Calf of his Leg broken by the greatness of the Wound the bones have been made naked and bare. For this Fracture happened upon his Ankles being gotten under the Leg of his Adversary that wrastled with him, in a transverse or overthwart manner; so that both the Heads thereof, as well that toward the Foot, as that above toward the Knee, were pressed downward with great violence: like as we also see it in Wood, which we our selves endeavour by bowing and bending it round to break. For if a piece of Wood be put upon ones Thigh, and then from both ends or Heads pressed down vehemently with the Hands, we shal then soon perceive it to be broken in the middle part.*

But yet notwithstanding even the very Constitution of the bones doth sometimes cause the Fracture of the bones; the Constitution of them being sometimes so brittle, that it cannot brook the least violence; and sometimes again more hard; so that it cannot be broken but with a far greater violence and force. And rottenness likewise rendereth the bones very frail and weak, and especially that which followeth the French Pox, and in those that often make use of Mercurial Inunctions. Of this strange and wonderful frailty and weakness in the bones there is extant a Memorable History in *Marcellus Donatus*, in his *Hist. Medic. Mirabil. B* 4. *Chap.* 5. And the story is briefly this: Vincentius Morellus, *Coach-man unto that Famous Poet, and Noble Patrician,* D. Dionysius de Pietis, *sporting, and playing the wag with others of his fellow Servants, snatcht up half an Orange from off the Table, and threw it as hard as he could at the Head of his fellow Servant running before him; but as it fel out, he did himself more mischief then the other. For in that Arm wherewith he threw (by reason of the strong and forcible motion) the bone of the right Shoulder was so broken, that the Heads of the broken bone being disjoyned one from the other, were easily and manifestly found to be so even by the touch. But strange it is to hear what followed. This bone was no sooner splinted and bolstered up with Iron plates (in regard that he could not now do his business as formerly) but at midnight lying in his bed, and awakening, he puts down the other Arm to reach himself the Chamber pot: in which Mo-*

tion

tion the bone of the left Arm was broken about the middle of it; and this was likewise set and bound up by the help of the Physitian. This Man for many yeers before had been sore troubled with the French Pox in a most grievous manner; in so much that his Head, Legs, and Arms were ful of hard knotty swellings, which at length by his often anoynting them with Unguents of Hydrarge, seemed to sink down and disappear. Wherefore we can think no other, but that the rottenness eating through the bones of the Arm, and thereby vitiating and corrupting them, made way and gave occasion for this so easie and much to be admired Fracture. Two Histories Paralel to this we meet with in *Schenckius* (in his 5. *B.* and 8. *Observat.*) from the observation of D. *Camerarius*. For *Capivaccius* had sometime related unto him, that a certain person in throwing an Almond shel against the pavement, instead of breaking that, brake his Arm. As likewise he related of another, that but knocking something with a Mallet, (and that not very hard neither) brake his Arm likewise. Two other such Histories we meet with in *Guilhelm. Fabricius*, in the 2 *Century of his Observations*. The first is of *Philibert Sarrazenus* (a Physitian of Leyden) who writeth unto *Fabricius* (*Observat.* 66.) in this manner: *A certain man* (saith he) *a Citizen of Leyden* (*threescore yeers of Age*) *was tortured with an obtuse and dull pain* (*for the space of almost two moneths*) *proceeding from a Flegmatick Gout in the Joynts of his Shoulder and right Arm. Remedies he used none all this while: only he procured what rest he could for that part, by having the Arm affected wrapt up in a Swathe, and continually resting upon his Breast. He being otherwise very sound and healthy, about eight of the Clock in the morning goeth forth abroad unto the shops; and while he was fitting on a Glove upon the hand of the right Arm,* (and that as gently as he could) *he brake the bone of his Arm* (*transversly or overthwart*) *four or five Fingers below the Shoulder. I being sent for went immediatly unto him, and there I beheld the whole business as it was, not without very great admiration; I searched the Arm and Shoulder; and by a Chirurgeon I restored the bone unto his former place, and commanded that convenient Remedies should be administred, and applied unto the part affected. After three daies I went again to visit this Patient, that I might search and find whether or no all things had been rightly ordered and applied. And having removed the Swath-bands and the Splinters, we saw that the bone was returned unto its Natural Scituation; and we soon perceived it to be so by pressing down our Fingers upon the place. But Lo, a little below this, about the Joynt of the Elbow, a new Fracture of the same bone* (*which as yet we had not seen*) *offered it self unto our view; very sad and grievous pains excruciate the Patient; and therefore we again betake our selves with all diligence unto our work, and endeavour again the restoring of the broken bone unto its proper place. Upon which al things succeeded well, and the pains were all calmed, insomuch that now he taketh very comfortable rest: but yet nevertheless, from that time forward the Swaths were never unfolded; neither was he ever seen* (*hitherto*) *to make any use of that part. And that which made me so much to admire the strange and wonderful unwonted frailty and brittleness of the bones in this Person, was this, that he altogether denied that he had been at any time troubled with any affects of the bones, contracted either from the Joul Disease, or from any other cause.*

The other History we find in the *sixty eighth* of his *Observations*, in these very words: *Philibert Brachlea* (of *Sequsium*) *being now in the fifty nineth yeer of her Age, of her own accord and without any manner of violence externally offered unto her by any whomsoever had her bones broken, so that she died thereof, in the yeer* 1606. *This Woman whiles on the Lords day* (*which it seems according to the Rite and Custon of the Country was held more sacred then ordinary*) *she was in the morning putting on a new Smock petticoat, lifting up her Body as she lay in her bed, and her Hands stretched forth above her Head, she perceived* (*by the great pain she felt on the sudden*) *that she had not only dislocated, but broken the bone of one of her Arms; so that there was need of the Chirurgeous help: who when he had fitly put together the extreme parts and ends of the broken bones, and bound them up with Swaths, he moreover outwardly administred fit and proper Remedies, and so at length had the happiness to Cure that affect. But this miserable and unfortunate Woman was no sooner freed from these streights, but she must yet again fal into a worse mischance, and undergo the violence and grief of a greater Malady. For when as at last* (*after that she had now a long time kept her bed*) *she desired to be raised up out of it by the help of her houshold Servants; before she went to the Fire side, her Maid that then waited upon her in putting on her Stockings,* (*so soon as ever she had but endeavoured it*) *only laying on her Hands to help her Mistress, brake the bone of her right Leg in a transverse overthwart manner; which the Chirurgeon again repaired. In these troubles and griefs the poor miserable Woman lived for the space of two yeers; and having al this two yeers time been troubled with divers Fractures, and innumerable pains from day to day) she had at length her life shortened and taken away by them.* And the Author of this Observation writeth, that the strange

and much to be admired fractures in this woman were not caused either by the French Pox, or from any other Diseases, she having not been at any time affected with the one or the other; nor ever in all her life troubled with any such sickness. But his conjecture is, that the true cause hereof was some occult and secret poyson, proceeding from some extraordinary and notable corrupting of the humors; which up and down, on all sides passing throw the whole substance of the bones corrupted it in this strange and unexpressible manner.

Signs Diagnostick.

A Transverse fracture, or that which is made in an oblique manner may easily be known, because that by the very touch the extremityes of the broken bone (being now separated) are soon discovered; and likewise in the place of the fracture there is found a Cavity, or hollowness that is not Natural. And moreover the body, and especially the broken Member cannot be moved after the due and wonted manner. And there ariseth likewise, before the bones be set and brought together again into their places, an extreme and most intollerable pain, whiles that the extremities of the broken bone prick and grate upon the parts nigh unto them, being very quick of sense and feeling. Which that it may be the more rightly known, the member that is found is to be compared (as Arm with Arm, Leg with Leg) with that that is broken. And very often also it so falls out that by reason of a broken bone the Member is made shorter then it should be, whilest the Muscles draw up the inferior part of the bone. And for the most part likewise fractures are generally and commonly well known; some violent causes (having power enough to break the bones) usually preceding. But then those fractures that are made longwayes in the bone, are not to be known but with more difficulty: and yet notwithstanding they may be discovered from the preternatural thickness of the Member, as also from the inequality, and pain thereof.

The bones oftentimes likewise impostumate and drop forth, to wit, when all their small parts and little pieces could not be brought back and set in their proper places, and thereupon are left destitute and naked of flesh: and this is known by the blackness of the bone, (if at least it lie open unto the view) or else by the stirring and moving up and down of the bone, if it be found not to adhere and stick close unto the other bones.

Prognosticks.

1. The fracture of the bones made according to the length of them is more easily cured then that fracture that is made either in an oblique, or in a transverse manner. For there is no such need of any laborious replacing of the bones; but it is sufficient, if the bones (gaping as it were) be again Joyned close together.

2. Among the Transverse and oblique fractures, that is most easily Cured (and hath least of danger in it) that is single or simple, and equal; and in which the broken bones are not at al moved out of their places.

3. Those fractures in which the heads of the broken bones are retuse and blunt have but little of danger in them: but when they are sharp-pointed, those fractures are the worst and most dangerous of any; inregard that they are not easily to be set close together (as having nothing of any blunt bone to rest upon) and because they also hurt and wound the flesh, and sometimes likewise a Nerve or Muscle, as *Celsus* tells us in his fifth Book, and *Chap.* 7

4. The fracture is then very difficult to be cured, when the bone is divided into many fragments; and the more the smal pieces are, still the more difficult is the Cure like to prove: and so also when there are sharp pointed stickings out, which prick and wound the parts that lye neer unto them.

5. By how much the greater the fracture is, and by how much the greater also the broken bones are, with so much the more difficulty and slowness is the fracture Cured.

6. When two bones Joyned together (as in the Arm, the *Radius* and the *Ulna*; in the Leg, the Ankle and the *Fibula*) are both of them broken, the Cure will be more difficult then if only one of these be broken. For if one of these bones remain whole and unbroken the Muscles cannot then so easily be contracted, as being kept stretched out by the unbroken bone. And so likewise when the broken bone is set again in its former place, if the other be whole, that serveth instead of a prop unto that which is broken; and a greater help and benefit it is unto it, then are either the swathes or the splinters, or both of them together. But on the Contrary, if they be both broken, al things that are performed in the keeping in its place the bone after it is set must be done with far greater Care, curiosity, and pains-taking.

7. The Fracture that is made in the middle of the bone is to be accounted lighter, and less dangerous then that which is nigher unto the head of the bone, whether it be the superior

perior or the inferior head. For whereas nigh unto the lower head there are many Tendons, and neer unto the upper head very many Nerves; the greater are the pains that are excited; and the Cure is rendered so much the more difficult. But if the fracture be nigh unto the Joynt, it is then the most dangerous of any, in regard that there are in that place both Tendons, and Nerves, and Ligaaments; and because that the broken part cannot there be so conveniently bound up; and because also, in this bloodless and cold place the heat is but very weak. And albeit that the fracture may in that place be consolidated; yet nevertheless it leaveth behind it a great impediment in the motion of that Member, by reason of the *Callus* which bindeth (as it were) the Tendons or Muscles.

8. A new fracture is very apt and ready to be consolidated. But if there be any time delayed, the Cure is thereby altogether rendered the more difficult; not only because that upon the happening of the inflammation that extension of the part (which is required) cannot be performed without much danger; but likewise because that the extremities of the bones become hardned, so that they can never after this be brought to Joyn and grow together again; and this more especially happeneth in aged persons. And therefore we must endeavour all we can that as speedily as may be the Extremities of the bones may be fitted and Joyned together the one to the other; for so by this means they wil afterward the more easily grow together again: for be it how it will, if so be that pain and an Inflammation happen upon the fracture, they render the Cure the more difficult.

9. If in a fracture of some one of the more eminent bones the fit and Convenient Cure thereof be protracted and put off beyond the seventh day; there wil then be danger lest that something of the bones be be nummed & impostumated; as *Galen* tells us, in his third Book of *Fractures Text.* 37.

10. And so likewise if there be a Contusion of the flesh, and a wound Joyned together with the Fracture, the Fracture is then very dangerous; and so much the more dangerous, by how much the wound is the greater; and especially if any of the greater Muscles (as of the thigh and shoulder) shal be Wounded. For then Inflammations do very easily happen; and at length, the *Gangrene*, and *Sphacelus*. And that likewise which here maketh the Cure to be the more difficult is this, to wit, that the splinters (and the other like things that are necessarily required for the keeping of the bones in after they are brought back unto their proper places, cannot so conveniently and fitly be administred, in regard that a hole is to be kept open for the better curing of the Wound.

11. If the bones be so broken and shattered that they cannot be reduced unto their former wonted State and place, we cannot then any wayes promise unto the Patient the recovery of his perfect health again: for although the bones may possibly grow together again; yet Nevertheless the Member is by this means made much shorter then before, and so altogether unfit for the discharge of its former offices.

12. The bones when they are so broken that they cannot possibly be restored again, we must then know that it will not be long ere they be impostumated, and fal forth; and so wil likewise those that are wholly destitute and bare of flesh: so *Hippocrates* in his third Book of *Fractures, Text.* 44. Now the bones impostumate, and drop out, sometimes sooner, and somtimes it is longer ere this be done. Those bones are sooneſt separated that are sooneſt withered, and sooneſt driven forth by the flesh growing underneath them. And therefore the smal bone is sooneſt impostumated and separated, and that bone likewise that is in some extreme part, and the bone also that is but thin; whereupon it is, that in less then fourteen days such bones as these last spoken of use to be separated. But the greater and more solid bones are longer ere they impostumate and separate; for it is both a longer time ere they are withered, and likewise ere they are driven forth by the flesh that groweth up underneath them: and hence it is, that they are seldom or never impostumated and driven forth before the fourtyeth day at the sooneſt; but now and then the impostumation and dropping forth of the bone is deferred unto the Sixtyeth day, and oftentimes also for the space of many Months. Yea and sometimes it so happeneth that the small fragments of bones shattered and broken al to pieces have not broken forth untill after many yeers; as we have an instance hereof given us by *Guilhelm. Frabricius*, in his 4. *Century.* and 97. *Observation.* And I my self likewise know a very eminent Commander, a Captain of foot, who at *Norinberg* was with a bullet shot throw the right Arm; by which his shoulder bone was broken; out of which wound even until this very yeer 1634. there brake forth fragments and smal pieces of Bones.

13. The Age likewise, the temper, and habit of the body, the course and kind of life, the time of the year, the Region, the state of the Heavens, and even all things else

whatsoever that have in them a power of determinating the Natural strength (either by augmenting or diminishing it) these al may render the Cure more or less difficult. And therefore it is that the Curing of a Fracture is in young persons a matter of no great difficulty; but in such as are aged and decrepite the cure is much harder, yea and oftentimes altogether impossible.

14. Fractures with an Inflammation and a bruising of the flesh are ful of danger; in regard that those cannot be fully and entirely Cured, until these shall first of all be perfectly healed.

15. Touching the time for the Consolidation of a fracture, there can nothing of a certainty be foretold; seeing that it differeth, and is very various according to the Age, habit of the body, the time of the yeer, and other such like Circumstances. For in such as are young, if they be of a good habit and Constitution, and observe a good and orderly Dyet, and live under a temperate Clymate; the bones in these are much the sooner consolidated: but far more slowly in aged people, and such as are more weak and infirm.

16. And lastly, the Fractures of the Nose, of the Jaw-bones, of the Throat, of the Breast, of the Shoulder blades, the Ribbs, the Spina or back bone, the Ankle, heel, Hand, and Sole of the foot, are consolidated betwixt the twentieth and the twenty fourth day; those of the Leggs and Arms within Thirty five daies, or betwixt the 35. and the fourtyeth day.

The Cure.

The Simple or Single fracture (being as it is a species of unity dissolved) hath even one only common and universal indication, to wit, that what is thus disjoyned must again be united. And although that this uniting be the work of Nature, as in Wounds; yet nevertheless, that Nature may the better attain unto her scope, and effect her purpose, there are yet many other things necessary. To wit, whereas the broken bones are for the most part removed out of their due places; if this shal so happen, then the broken bones are again to be restored unto their own proper places; and then in the next place, they are with all exactness and accurateness to be fitted and joyned together, as before in their Natural state; and so being in this exact manner conjoyned, they are thus to be kept. Which things when the chirurgeon hath with all his skill and dexterity accomplished, the Uniting afterward of the bones, and the generating of the *Callus*, are to be committed unto Nature, as her proper and peculiar work. And yet Nevertheless, the Physitian ought not to be remiss in affording unto Nature the best of his help and furtherance: and this he may do, if he do what he can for the preserving of the Natural temperament of the part; and take care that the inflammation and all other the Symptoms that usually accompany and attend these fractures, and disturb nature in her work, be prevented and kept off. Or if they shall at all happen, that with what speed he may he remove them.

What things are necessarily required for the Curing of broken bones.

And therefore, in the first place, (as *Cornelius Celsus* teacheth us, in his *B.* 8. and *Chap.* 7.) we are to be wel advised upon mature Consideration, whether the broken bones be fallen out of their places, yea or no: for it is alwaies so, that when the bones are broken in a transverse or overthwart manner, they fal out of their own natural Seats. Now it is known that the broken bones are not removed out of their proper places, if in the place where the fracture is there be no Cavity or hollowness perceived, neither any sense of pricking; and that the Member doth not appear shorter then before. And therefore in this kind of fracture there is not any need at all that the member be any whit extended; or that we trouble our selves in the least with the returning back and fit joyning together of the broken bones. For it may so very easily come to pass (if this be but attempted by us) that pains may be excited, & the heads and such parts of the broken bones that stick forth may hereby be crushed and grated one against another, and so broken: but here we are only to endeavor, that the broken bones may be kept in their own Natural Seats, and there again united, as anon we shall further shew you how this is to be done.

But if the broken bones shall be fallen out of their own proper places, so that one shal be carryed forth and cast upon another, then in this case our first and main Care ought to be, that these broken bones may again be restored unto their own places. Now this is to be done (chiefly and primarily) by two operations, the former whereof is called Catatasis or *Antitasis*, i. e. *an Extension*; but the other we term *Diorthosis*, *i. e. Conformation* or a putting back again of the bones into their own places. But now, so it is that none can rightly perform these operations, but he that wel understandeth the Nature of the bones, and knoweth the differences of fractures. The Nature of the bones is to be known out of *Galen his tract. of the bones*, & the books of other Anatomists; especially by our own ocular

ocular inſpection, and taking a right view of them in our Anatomy Lectures. And for the differences of Fractures, *Galen* (in his *ſixth B.* of the *Meth. of Curing*, and 5. *Chapt.*) tels us what they are.

And firſt of all therefore in the reſtoring and returning back of the broken bones into their places, there is requiſite an extenſion of the part. For when as without the Cutting aſſunder of any Muſcle either the parts of the broken bone are removed out of their proper places, or elſe that the Joynt is fallen forth of its due place, the Muſcle whoſe beginning is annexed unto that part into which either a part of the broken bone inclineth, or the Joynt falleth forth unto, is wholly drawn back unto its own Head; and ſo by this means together with it ſelf it carrieth along that part of the Member which is Joyned with it. Wherefore it cannot poſſibly be that either the broken bone ſhould be rightly conformed, or that the looſened bone ſhould be again reſtored back unto its own place and ſeat, before that it be ſo much drawn back as it was before removed out of its place into this or that part. For otherwiſe, if (to wit) there be not made a right extenſion, in Fractures, by attrition the eminencies (or parts ſticking forth from the bones) would be broken, by being cruſhed together one againſt the other, ſo that they could not poſſibly be put back again into their own places and Cavities, but that they muſt either externally ſtick at the ſides of the bones, or elſe they muſt ſtil remain among the broken bones, and by this means the Coaptation and due Joyning together of the bones ſhould be very much hindred.

Extenſion how to be performed.

And therefore that the broken bone may be rightly conformed, it is requiſite that both parts of the broken bone be diſtended backwards, or otherwiſe as need ſhall require; and this extenſion is by the Greeks called *Antitaſis*. But that the extenſion may be rightly done, we muſt endeavour that it may be performed either with no pain at all, or no more then needs muſt. Now this will be done, if the member to be extended be placed in ſuch a Figure as wherein the Muſcles do nothing at all, but all of them are as it were idle and looſened; that ſo all the Fibres of the Muſcles of the ſaid member may be extended directly and ſtraight forward: by which means there wil be need of the leſs extenſion, and the whole buſineſs performed with very little or no pain.

Now this extenſion and diſtraction is to be done either by the labor and pains of one alone, or elſe by the Hands of many together; and this indeed likewiſe either by their Hands only, or elſe alſo by certain Reins or Curbs, or by Swaths, or other Engines and devices uſed for this purpoſe. When the Finger is broken, or any other tender member, the extenſion may then be performed by the help and pains of one alone, who is to lay hold on one part of the broken member with his right Hand, and on the other part with the left, and ſo drawing them apart one from the other: or elſe it is to be done by two together, ſo that one of them may hold the part of the broken member, and the other extend and ſtretch it forth. But if the member that is broken be greater and more ſtrong, then the help of many together will be needful; ſo that one may indeed with both Hands lay hold upon one part of the broken member, and another at the ſame time may likewiſe lay hold with both Hands on the other part of the broken member; that ſo they may by drawing towards them (one from the other) bring the ſaid broken Member cloſe together. And ſomtimes likewiſe there wil be need of binding it round about with Swaths, Linen Clothes, and Staies; and of fitting theſe on all ſides unto the ſaid broken Member, like as with a Cord, or Nooſe; for the drawing of all which together, (that it may be rightly done, to wit, by drawing ſeveral waies, the one from the other) the help and aſſiſtance of divers at once will be very requiſite. And oftentimes likewiſe, even then when there is occaſion for a greater extenſion (but yet without any violence) there are together with theſe certain Engines to be adminiſtred; touching which, ſee *Hippocrat.* in his *ſecond B. of Fractures, Text* 40. &c. *and Oribaſius*, in his *Tract. de Machinam.* and *Paræus*, in his 15. *B.* and 7. *Chapt.*

Now this Extenſion is either equal, or Unequal. We cal that an equal extenſion, in the which the Member is equally extended from both ſides of the broken bone: but the extenſion wherein the Member is more extended from one ſide of the broken bone then from the other, we then cal it an Unequal extenſion; and this hath then is place, when but only one of the two bones in the Ankle or the Elbow is broken: for that ſide is moſt to be extended in which the broken bone is contained.

Extenſion how manifold.

But now the *Diorthoſis*, or Conformation, is the replacing and putting back again of the broken bone into its own place, and the right Coaptation or fitting together of the extreme parts of the broken bone; which is done, if after that the Member is ſo far forth extended that the bones to be replaced cannot

Conformation.

be

be brought to touch one another, the Chirurgeon with both Hands lay hold on both parts; and that he then thrust back unto the right part the Member that is fallen forth unto the left; and so on the other side, that he thrust back unto the contrary part that Member that is fallen forth forward; and so on the Contrary; and that he never leave thrusting back the Eminencies or stickings out of the bones into their Cavities and hollow Seats, until the extremities, *i. e.* the ends of the bones be rightly united, and driven back into their proper places, and that the Member have recovered again its Natural Figure. But now these stickings out of the bones are not with any impulse or violence at all to be thrust back again into their Cavities, lest that by this violent handling of them they should be broken; but rather let them of their own accord (the extension being loosened) return back into their own seats; and let them be gently directed hereunto by the Hands of the Chirurgeon. And all these things are (as soon as may be) to be done, before that an Inflammation happen: for if there chance to be any Inflammation, and then afterward the extension of the Member, and the replacing of the bones be attempted, a Convulsion may easily be excited.

But if the Chirurgeon be not called until the Inflammation be already begun, so that by reason thereof the bringing back of the bones may not so much as be attempted, then by all manner of means he ought to oppose the Inflammation; and he is likewise to endeavour that it may speedily be removed by those Medicaments that are above propounded, in the *first Part*, and 5. *Chapt. of an Inflammation.* And in the mean time he ought to be very Sollicitous and Careful of the part affected, lest that it readily receive the fluxion: and this may be done by Repellers; and by placing the part in such a manner, and so handling it, that no pain at al may be brought upon the Patient. When the Inflammation is over and past, we must after that endeavour that the bones may be reduced unto their proper places.

But then if the extremities of the broken bones break forth, and stick out of the Skin, by what way and means such a Fracture is to be Cured, we shall shew you in the *Chapter following.* When these things are thus performed, we ought then to take good notice, whether or no the bones be rightly fitted and placed together. Now it may be known by this (as *Hippocrat.* telleth us in his *third B. de Officin. Medic. Text* 24.) if the Patient be no longer so much infested with pain, as before; if the eminencies of the bones now conjoyned within themselves do no longer prick the part; if while the broken part is touched by the Hand there be perceived no Cavity, no sticking out, or unevenness; and if the broken Member being compared with its fellow that is sound, (that is to say) the Shoulder with the Shoulder, the Thigh with the Thigh, and the Legg with the Legg, it be found to be almost equal, and like unto it, both in its Figure and Magnitude. Almost, I say, indeed, because that in the thickness there may be some kind of difference betwixt them; in regard that by reason of pain and the afflux of Humors, the broken Member doth for the most part swel up and grow somwhat big.

When we find and are sure that the bones are conformed, the extension is then by degrees to be remitted; and we are then to take care that by a fit binding up of the Member the bones when they are wel fitted and placed together may so remain united, and rightly conformed. And this is to be done by two other operations, to wit, the binding up and the placing of the Member. Wherefore there are some who write, that the Curing of Fractures cannot be performed and compleatly finished, but by these four operations, *viz.* Extension, Conformation, Binding, and placing of the Member.

The binding up of Fractures.

Notwithstanding, before ever we attempt to rowl any Swathe about the broken Member, some certain Medicaments are wont to be applied and laid on, for the preventing the afflux of Humors, and the Inflammation, and likewise for the helping forward of the *Callus* that is to be generated: but in this, for the matter thereof, Authors do somthing differ. *Hippocrates* maketh use of a *Rose Cerote*: *Celsus* useth Clothes dipt in Oyl and Wine. Others there are, who at the first lay upon the Fracture a *Cerote* of *Roses* with a broad Linen Cloth, and then afterward they put upon it a Linen Cloth well moystened in sharp black Wine, or else the Juyce of Pomegranates: others use hurds moystened throughly in the white of an Egg shaken well together, and then a little Squeezed: and others (which practice is now adaies most in use) do anoynt and spread upon a Linen Cloth a mixture made of the *white of an Egg*, and Astringent Pouders of *Bole-Armenick*, *Dragons blood*, *Roses*, *Pomegranate flowers*, *the Roots of Consound*, *Frankincense*, and the like; and this they lay upon the Fracture. Which said Medicaments are in all the bindings so long to be continued, even until there shall be no further fear of an Inflammation, and that the Fracture begin now to be stable: and afterwards we are to apply (if it be in the Summer) the *Diapalma Emplaster*;

plaster; but in the Winter the *Emplastrum Barbarum*; or some other that is in all respects suitable and Convenient. And this diversity of the Medicaments seems upon very good ground (and not without Cause) to have been brought into use and practise by Authors. For when there is an Indication of Strengthening and Establishing the Fracture (and that pain and the fear of an Inflammation forbid it not) the *white of an Egg*, and astringent Cataplasms are made use of: but if the Patient be afflicted with sore pain, then we are to use the *Cerote* and *Oyl of Roses, and Wine.* Or,

Take *of the dead head out of Lin-seed, Lin-seed powdered, unsalted butter, Roots of the greater Comfrey, of each four ounces; Bole-Armenick, and Ceruss, of each one ounce; the whites of fifteen Eggs; Make a Cataplasm; let it be put upon the Fracture, and after two daies removed. Repeat this five times, one after another.* Or,

Take *of the finest Flower half a pound; Mastick, and Gum Arabick, of each one ounce; Mummy, and Bole Armenick, of each half an ounce; with the whites of Eggs make a Cataplasm.*

Very useful likewise is the Emplaster of *John de Vigo*, which he mentioneth in his 8. *B.* and 6. *Chapter.* And *Guilhelm Fabricius* in his 4. *Cent. Observat.* 99. useth this Emplaster.

Take *of* Slobanus *his Emplaster four ounces; Powder of the Root of the greater Comfrey, of Red Roses, and Myrtles, of each two drams; the Stone Osteocolla prepared, six drams: mingle them together over a gentle Fire, with a little of the Oyl of Roses, and make an Emplaster.*

The common and vulgar Chirurgeons (in Fractures) are wont oftentimes (even at the very first) immediatly to apply the *Oxycroceum* Emplaster: or if this be not the very first of all, yet it is a Remedy that they never fail to make use of within a very few daies after the Fracture is made. But this cannot be done without much danger; as in *the place alleadged Fabricius* sheweth us by an example. For it being so that this Emplaster heateth the part affected, and thereby attracteth the blood and Humors, it must needs produce an itching, pain, Inflammation, and Gangrene; and especially in the Body that is Cholerick and Cacochymical.

After that fit Medicaments have been imposed upon the part affected, then we must proceed to the binding of it up; and this must neither be over loose, (lest that the bones be again removed out of their places) neither over streight and hard, lest that it hinder the afflux of the Aliment, and excite pain. Now this is to be performed with two Swaths; the one whereof (which may not unfitly be first moystened with *Oxycrate*) is to be cast over the Fracture, and upwards to be rowled round about it twice or thrice, (so that much of the sound part be taken in in the Swathing) that so the bones when they are set back again into their places may there be kept and continued; and likewise that the conflux of blood unto the affected part may by this means be prevented. The other (longer then the former by the one half) is to be rowled about in a Contrary manner; and being first of all cast upon the Fracture, (and beginning from the same) it is some certain times to be rowled about downward, and then again to be drawn up above the said Fracture; and at length to be carried toward the sound part lying above it. For so by this means, if it should so happen that by the first Swathe any Muscle should chance to be distorted and made to stand a wry towards some one part, it is amended by the second; the Humor is likewise pressed forth of the part; and the influx of the blood, (as well from the inferior, as the Superior parts) is hindered and prevented. For all bindings whatsoever have in them a power of pressing forth the Humors out of those parts upon which they are first of all cast, into those parts where they are ended.

And this binding which is performed by these two Swaths, is by *Hippocrates* called *Hypodesis*; and the Swathes themselves he calleth *Hypodesmidai*. But now that in the greater bones the binding may be the more stable and firm, certain coverings (which the more modern Authors term *Plagulæ* and *Splenia*) are to be put above upon them; and then after the putting on of these, the binding is to be made firm and strong by two equal Swath bands (which *Hippocrates* calleth *Epidesmoi*) of which the one is from the lower part carried upward toward the right hand, or toward the left; and the other is carried downward, the quite contrary way unto the former: which binding is by *Hippocrat.* termed *Epidesis.* And here we ought to be very cautious, that the binding be not either in an over-loose manner (for this will not sufficiently retein and keep in their places the bones that are newly brought back) or else too hard and close; (for this may cause pain) but shunning the inconvenience of both the former, we are to make choyce of that middle way, that so we may enjoy the benefit and usefulness of both. And if a few Swathings about be not sufficient to contein and keep in the Fracture; then it will be best, for the more security, to add unto the number of them.

And

Splinters to be put upon Fractures, to strengthen them.

And that the bones when they are reduced unto their proper place may be there the better established and kept firm, (that they be not again moved out of their places, *Ferulæ* (or Splinters,) are to be put above upon them, if the Nature of the place affected will bear the same. For seeing that Swathes and the Coverings which they cal *Splenia* are very flexible and yielding, they cannot possibly keep the Fracture firm and direct, but that it may easily happen, that whether the Patient wake or sleep, the Member may be moved. And therefore that in those motions which are not much heeded the Member may be kept firm, and held tight, there will be need of those things that are stiff, and are not easily bowed, and yet nevertheless not over weighty and ponderous. Unto which end and purpose (as *Hieronymus Fabricius* speaks) *Hippocrates* could not in all the world again (after his *Plagulæ* or Coverings) have invented and fitted us with better instruments then these *Ferulæ* or Splinters, that are both stiff and inflexible; and likewise very light, and not at all oppressing the part affected by their weight. But when we want these Splinters, we may instead thereof make use of thin pieces of Wood. And some there are that in the place of these *Ferulæ* make use of the Rinds or Barks of Trees. But if any wil make use of these, let him look well to it, that they be not green, but throughly dried. For those that are green, when once they become dry, they then are contracted about the Fracture, and do excitē pain; and somtimes also they again remove the bones out of their places; as *Guilhelm. Fabricius* by a peculiar example teacheth us, in his *fourth Century*, and 89. *Observat.*

The placing of the broken Member.

And Lastly, (if need so require) the pipe may likewise be administred unto the Member; touching which both *Hippocrat* and *Galen* make mention, in their *Tract. of those things that ought to be done in the Curing of Fractures*, *Text* 18. and the member is rightly to be placed; and we must see well to it, that its position be soft, equal and even, and turned upwards: soft, that so it may not press together the broken Member in that part, neither cause pain and inflammation: equal and even, that it may produce no pain, nor cause the Member to stand awry: and it must be turned upwards, that so the Humors by their weight tending downward may not flow unto the place affected. But more especially we must do our endeavour, that there may be observed a middle Figure of the Joynts; and so likewise a middle figuration of the Muscles: unto which end also there may be somtimes administred certain little Coffers or Caskets (the Latines cal them *Capsulæ*) which all the whole time of the Cure may receive and contein the broken Member. *Hippocrat.* (in his *B. de Officin. Medic. Text* 3. and 30.) in giving a right and due Scituation unto the Member, commandeth us to take notice of, and wel to heed these three things, Rest, the Middle or Mean position, and Custom. Rest indeed, that so such a Scituation of the Member may be chosen, as a man is wont to keep at that time when he is most free from all manner of busines, and most addicteth himself to ease and idleness. But the middle Scituation is a posture betwixt extreme distension, and Contraction; and yet nevertheless not alwaies exactly, but such as cometh neerest unto the mean or middle position. As for example; in the Arm, that is to be accounted for the middle Scituation, which doth not Constitute a right Angle in the Elbow, but rather an obtuse and blunt Angle; and such as comes somthing nigh unto a stretching of it forth: like as we see men when they are quiet and idle, they hold not their Arms exactly in a just middle posture betwixt being altogether stretched forth straight, and wholly bowed and bent together; but somwhat more inclining and tending toward a stretching of it forth: which Figure is therefore most pleasing unto them, in regard that it is most free from pain. And then lastly, Custom is also much to be regarded and lookt upon; because that no other habit is so easily born as that unto which we have accustomed our selves. Unto which we may likewise add a fourth, out of the same *Hippocrates*, (in his 1 *B. of Fractures*, and 1 *Text*) to wit, that such a state of the Muscle is to be chosen, under which the broken bones may be drawn divers and several waies, without any great adoe, or offering violence unto them; and such as when the Member is conteined under that habit, it is then free from all pain. He only doth both these, who so Figureth and placeth the Muscles, that their Fibres may be direct, and stretched forth in a straight manner. Now they may be said to be direct, and directly extended, when the whole Muscle is placed in one part of the Member. For if the Muscle that hath its beginning in the interior part be so placed that the Scituation thereof be in the middle from the interior part, and extreme from the exterior; or so, that the Scituation of it be in the midst from the superior part, and extreme from the exterior, by this means it is wrapped together about the Member, and so extended.

Now when the binding is right, and performed as it ought to be, it is known by this; (as

as *Hippocrates* tells us, in his 1 B. of *Fractures*) first of all, by the moan and complaint made by the sick person, when you ask him whether he be pressed too hard by the said binding, and he shall answer, that he is indeed pressed, but lightly, (and so that he can wel endure it) and that especially in the place where the Fracture is. And therefore whosoever he be that hath his Fracture rightly bound up, he must of Necessity confess that these things are so. But when the Patient is abundantly troubled and pained under these swathes, they are then speedily to be loosened, and more fitly to be bound; lest that from the too hard binding dangerous symptoms should happen to arise. But on the other side, if the windings about of the swathes be looser then is meet, and that the Patient shall answer that he feels not the swathing at all, the swathes are then to be drawn somwhat harder; in regard that these bindings if they be over loose, they cannot prevent the Members being depraved in that part where the Fracture is.

There are also other signs of a Moderate binding, and when it is as it ought to be. If the same day and night in which he was bound up with these swathes he seemeth to himself not to be lightly bound, but somewhat hard and streight; and the day following, a soft and small tumor arise in the extremity of the Member. For the smalness of the swelling and softness sheweth that there is somthing pressed forth (by the binding) from the part affected unto the extremity and utmost part of the Member. But if there appear no swelling, it sheweth that the fracture was not bound hard enough: and if the swelling be great and hard (that is, such as wil not readily yield unto the touch) that is present in the extreme or utmost part of the Member, it then giveth us a sure sign and token, that the part affected is too hard swathed and bound up.

And therefore if we find the signs of a due and fit binding up of the fracture, and that there be no considerable pain present, neither any inflammation or exulceration suspected, the rest of the work (which is the producing of a *Callus*, by the which the broken bones are Joyned together) is to be committed to Nature, whose work it is; and the binding not to be loosned before the third day. But on the third day let the swathes be loosened, and again rowled about the fracture, to the end they may both be drawn harder and closer upon the place affected; as also that there may be opened a passage forth for the humors and vapours contained under the skin: which that they may be scattered, and that there may be no itching excited (or if there be any Itching that infesteth the Party) *Hippocrates* wil have the Member to be bathed in warm water (or the water to be poured upon it,) that so the pores may be opened. But if we be slow in the loosening of the binding, there arise from thence oftentimes great inconveniences; to wit, an exulceration of the part, a putridness, and Gangrene, yea and even the hazard and danger of the life. Examples whereof we meet with in *Guilhelm. Frabricius*, in his *second Century*, and 91. *Observat.* And therefore he adviseth us that every second, or at least every third day, the binding be alwaies loosened: and that although after the seventh day there be no such urgent Necessity of the often loosening the fracture, yet Nevertheless his own practise was every fourth day to loosen the swathbands; and (as he writeth) his Custom was to take an exact view of the part affected. And this binding is to be continued until such time as the *Callus* be bred, and the fracture healed; which in the Thigh is wont to be done in fourty days, in the shoulder and Ankle in thirty, in the *Radius* and Elbow in twenty, and in the bones of the Fingers in five days. But yet this time cannot be so easily and precisely determined in all of them (as we told you in the Prognosticks) but it much varyeth according to the Aage, Constitution of body, time of the yeer, and the Nature and Condition of the Fracture it self: for a fracture is much sooner cured in a young person, then in one that is Aged; and sooner in the spring time, then in the summer.

But in the Mean time (While these things are in doing) universal Medicaments are not to be neglected; to wit, the opening of a vein, and purgation, even according as this or that Constitution of the patient shal require. And al these things are to be done for this end, that so the bones may be conglutinated. Now this is done by the benefit of the *Callus*; which whether it be somthing that is heterogeneous, or else in its substance like unto the bones, we have shewn you above, part. 4. *Chapt.* 4. But now the generating and production of the *Callus* (by which the bones are conglutinated and made to grow together) it is the work of Nature: but yet the Physitian may and ought to help and assist Nature in this her operation; and this he may do, if he take care to prevent and keep off inflammations, or the like Accidents that might any way hurt the substance and Temperament of the Member; and that the Aliment it self by drying Medicaments be so disposed, that it may thereby the sooner be changed into a *Callus*. Now this may almost

The generating of the Callus.

wholly be effected by the Medicaments above mentioned; in the place whereof (after a few daies) there are to succeed likewise the *Emplaster Diapalma*, *the Emplastrum Barbarum*, *Oxycroceum*, *the black Emplaster*, and the like.

And furthermore let the Physitian endeavour that there may be a sufficient supply of a matter fit for the breeding of the *Callus*. Unto which end, the Food administred unto the Patient let it be somwhat more plentifully given then formerly; and let it be of a good and somwhat a Tenacious Juyce; such as proceeds from Rice, Wheat, and the like. But because that before the twelfth day there is scarcely ever any *Callus* generated, or that so much as beginneth to breed; and moreover that at first there are many Symptoms to be feared: therefore this ful Dyet is not presently to be allowed of in the very beginning, but a more sparing Dyet is to be observed; yea and (if need require) blood is to be drawn forth by opening a Vein, or purgation to be ordered unto the Patient; and then after this, in the end (as we said before) when the *Callus* beginneth to be generated, a more ful Dyet is to be allowed him.

And there are wont likewise some Medicaments to be administred inwardly, which conduce much unto the more speedy generating and producing of the *Callus*; as the *Pouder* and *Juyce* of *Agrimony Roots*. And very many there are, that commend most highly the *Osteocolla* stone before spoken of; of which beaten smal into a pouder they oftentimes give one dram, with *Comfrey Water*. But in such as are young, and those that are of a good habit, this *Callus* groweth and increaseth too much by this ful Dyet: wherefore it is not to be allowed unto them without much caution; but only unto such as are more stricken in yeers. Touching which thing, as also touching the use of Meats viscid and tenacious (which most Physitians conceive are to be appointed in Fractures) you may read *Guilhelm. Fabricius*, in his 1. *Century*, *Observat.* 90. 91. and 92.

There may likewise be Decoctions prepared, of the *Roots* of *Consound*, (both the *greater* and the *less*) *Dragon-wort*, *Agrimony*, and *Primeroses*. As,

Take *Roots of Consound, and Dragon wort, of each one ounce; Storks bill, one handful; Savine, half a handful; Mace, half an ounce; Zedoary and Galangal, of each two drams; boyl them in Wine in a double vessel: and let the Patient drink twice a day of the straining.*

The same *Fabricius* (in his 3. *Centur.* and 90. *Observat.*) makes use of this Medicament.

Take *the Ossifrage Stone carefully prepared, one ounce; Choice Cinamom, three drams; Sugar, two ounces; Mingle, and beat them into a very fine pouder: give two drams hereof in Flesh broth every day in the morning. And for external Remedies, he commendeth such as these.*

Take *Oyl of Earth-worms, two ounces; Grains of Juniper, two drams; the Juyce of Earth worms, one ounce; Mingle them, and make a Liniment, with which anoint the Fracture.* Or,

Take *Vigo's Emplaster for broken bones, two ounces; Oxycroceum, half an ounce; the Osteocolla stone prepared, one ounce and half; Earth worms prepared, and poudered, one ounce; with as much of the Oyl of Earth worms as will suffice; make an Emplaster, and lay it upon the place affected.*

When the *Callus* that is bred is come unto its Just magnitude, it is then to be confirmed by Medicaments that Corroborate: and therefore such an Emplaster as this is to be laid on.

Take *Oyl of Roses, two ounces; Wax, three ounces and half; the Pouder of Rosin, three ounces; Colophony, Mastick, Frankincense, of each half an ounce; Cypress Nuts, and the Root of Madder, of each one dram; Saffron, half a dram; Mingle them, and make a Cerote; which may be spread upon a Linen Cloth, or a piece of Leather, and so applied.*

The Diet.

And as for matter of Dyet, there ought to be likewise a good and an exact Course, such as before we told you of in Wounds. For if Nature be not offended either by the quantity or the quality of the Food, she will then more rightly discharge her Office and part in the generating of the *Callus*. And indeed some there are who appoint Meats viscid and clammy, of the Feet, Heads, and intestines of some of the Creatures. But we may well fear, lest that from such like Meats as these there may be bred a thick and viscous Chile that may afterwards breed obstructions in the Liver and the Veins, and may infect the whole Mass of Blood; like as *Guilhel. Fabricius* gives us an instance of this very thing, (in his *first Cent.* and 92. *Observation*) in a certain person (a man fourty yeers old) who by the use of such kind of meats fell first into a *Cachexy*, and soon after into a Dropsie, and of this Dropsie he died. And we have sufficiently found by experience, that many sick persons in this Case have without the use of any such Food been perfectly recovered.

CHAP.

Chap. 2. *Of a Fracture with a Wound.*

THe main and chief Difference of a Fracture (and that which very much varieth the Cure) is a Fracture with a Wound. Now this happeneth when the sharp Eminencies or points of the broken bones do perforate the flesh that lieth upon them. Which whensoever it happeneth, the Member is made shorter then it was before: but when the naked and bare bones are restored again unto their proper places, the Member then returneth unto its pristine Longitude. And yet nevertheless somtimes these like fractures happen by some cutting Weapon, when by it not only the flesh, but even the very bone it self is Cut.

But now in these Fractures with a Wound, the bone is somtimes made naked; and somtimes again it is not left altogether bare: and moreover somtimes also we fear the falling out of the bone, or some Fragment thereof; but then somtimes again we fear no such thing.

Prognosticks.

1. But now such like Fractures are yet far more dangerous, if they happen to be with the Flesh and Skin lying over it remaining stil whole and sound. For that perforation exciteth a pain and an Inflammation of the Skin and Flesh; and so the Muscles that are now affected with this Inflammation are forced to suffer a double extension; one that is caused by the Inflammation; the other, that which happeneth unto them from these things that befal them while they are returning unto their former length.

2. But now this danger is so much the greater by how much the parts that are broken and shattered are more noble and principal; as the Muscles, Nerves, Veins, and Arteries.

3. And from hence it is, that a Fracture in the Thigh and Shoulders, with a Wound, and the falling out of a bone, is the most dangerous of all: touching which *Hippocrates* thus, in his *third B. of Fractures, Text* 47. *But they seldom or never escape* (saith he) *whose bones (either of the Arm or Thigh) have fallen outwardly: for as these bones are very great, and very ful of Marrow: so likewise there are besides these many other things wounded that are of very great moment; to wit, the Nerves, Muscles, and Veins; whereupon also it is, that if you put them back, Convulsions are wont to be excited: but then again if you do not put them back into their former places, there will then arise acute and Cholerick Feavers, with a sighing, and a blackness of the place affected. Yet notwithstanding they do not less escape, in whom we neither put them back, nor so much as attempt the doing of it. But furthermore, they also are more likely to escape, who have the lower bone, then those that have their upper bone fallen forth outwardly. And they likewise do somtimes escape with life (but this is very rare) that have these bones replaced and set where they were before.* And in *Text* 41. he saith thus: *And yet notwithstanding a Convulsion is rather produced if these bones be restored unto their places, then if there be no possibility of restoring and replacing them.* And *Celsus* in his 8. *B.* and 10. *Chapt.* saith; *That it is yet somwhat more grievous, when unto the Fracture of a bone there is likewise added a Wound of the flesh, and especially if the Muscles of the Thigh or of the Shoulder be sensible thereof: for these have alwaies the much more grievous Inflammations; and they likewise have Cancers more apt and ready to seize upon them.* Now the danger is much more augmented if the bone fal forth from some domestick (if I may so term it) & interiour part, then if it be from a wild external part; for in the former there are found parts of a far greater account and value. Whereupon it is that *Hippocrates* (in his 3 *B. of Fractures*, and 47. *Text*) writeth; *Neither is it moreover a matter* (saith he) *of little Consequence whether or no the bone break forth unto the exterior part of the Arm or Thigh; in regard that through the interior parts of them there are carried along many and those principal) Veins; of which if any chance to be wounded, and battered together, they Choak and Throttle the party; but the Veins that are conveyed through the Exterior parts, as they are fewer, so they are less considerable.*

4. A Fracture with a Wound, if it be made with some cutting Weapon, is dangerous, if it be a great bone that is cut, such as is that of the Thigh or the Shoulder. For such like bones as these (especially if the incision be direct and straight) will very hardly be brought to grow together again; because that by this cutting Weapon the pores of the bone, through which the Aliment for the breeding of the *Callus* did formerly pass, are in a manner obstructed, and so the *Callus* is the longer ere it be generated. And moreover, in regard that such a Fracture is equal, the broken bones are most difficultly kept from being moved; and so by this the Coalition and growing together of these bones is very much impeded.

The Cure in General.

We have here two Indications given us: the former whereof is, that the bones be

again restored unto their own places, and there exactly Joyned together; and the other is, that the Wound may be healed. The replacing of the bones is here altogether difficult, by reason of the parts that are wounded which without great pain, and fear of a convulsion, cannot be extended. Now the way and means to return these bones unto their places again, is, first of all by extending them sufficiently, but yet without all kind of violence: which if it cannot otherwise sufficiently be done, then we must have ready at hand firm and strong Iron Instruments, (like unto Bars) something different in their bigness one from the other; out of which some one of them that is fit and convenient, in the inferiour part is to be administred unto the lower part of the broken bone, but in the superior part unto the upper part of the said broken bone, (like unto an Iron Sparre or Leaver) and so by this means the broken bones shall be forced and driven again into their proper places: touching which *Hippocrates* (in the 3. *B. of Fractures, Text* 39.) writeth in these words: *If* (saith he) *the bone also that is fallen forth upon another bone leave not any fit place for the Iron Sparre; or if that it be so sharp that it start away from it, we must then with a File hollow the said broken bone, until there be a place made for the Iron Sparre, and that it firmely stick unto it.* And the truth is, all these things are to be done instantly, even the very first day, before any Inflammation to arise. For if this should happen, neither the extension nor such putting back of the bones can be so much as attempted without very great danger. If therefore the Chirurgeon be not sent for even at the very first, and that he come not until there now plainly appear to be present an Inflammation, he ought to deferr the putting back of the bones into their places, until he find the Inflammation over and gone. I my self once on a time was present at the Curing of a certain Peasant, who getting up into a Tree to beat down the Acorns, fel down from it, and brake his Leg neer unto the Ankle, insomuch that the bone sticking out rested it self and lay upon the Ankle bone. And he not having in a readiness a fit and expert Chirurgeon, an Inflammation and *Gangrene* happened, which wasted and consumed almost all the Skin and Flesh about the Ankle. He was then carried into the City, where the *Gangrene* ceasing, the bone standing forth by the Iron Sparre or leaver was lifted up, and restored unto its former place; and then after this all things else that were necessary being performed, the Fracture and Wound were healed.

But if it happen that any smal part of the bone shall so stick out that it cannot easily be put back again into its proper place, but that by reason of its various Fraction one part and portion of the bone be an impediment unto another; and that likewise it be not thought fit to attempt any stronger extension of the soft parts, by reason of the pain and Convulsion that may thence be feared; and that the bones may in their conformation rent and tear those parts that lie neer them, and thereby produce pain; in al these regards *Hippocrates* (in his 3. *B. of Fractures, Text* 4.) adviseth us to cut them off, either with the cutting File, or with the Saw, as it shall be thought most convenient, and as may be done with most opportunity. And so likewise, if any portion of the bone break the Flesh, and excite pains, (so that we cannot so much as attempt the replacing of them without a greater disruption) and excruciating tortures in the highest degree, even in this Case also we ought to cut off the bone. But then withal, lest that what happeneth through necessity in the Artificial operation should be imputed unto the Error of the Physitian, the Patient and the by-standers are to be foretold that that part will be shorter then before. And this likewise *Hippocrates* (in his 3. *B. of Fractures*, and 46. *Text*) admonisheth us of, whiles he saith, *That it is also fit that we know this, that of necessity the Bodies must there be made shorter, where the broken bones are diminished, that is to say, Cured by being cut off.* But now in such Fractures as these that are Joyned together with the Wound of the Skin and Flesh lying upon them, we must look well to it likewise, (before ever we Joyn the bones together, and also after that they are thus Joyned) that nothing at all stick betwixt the broken bones, which may any way hinder the Conglutination: and if any thing be found sticking there, (whether it be some smal part of a bone, or any thing else) it is forthwith to be taken out; but this must not be done with any violence, lest that a pain, Inflammation, or Convulsion should be excited. And therefore if at the first, (even in the very beginning) this cannot be performed without violence and pain, it will be more advisedly done of us to defer it, for Nature her self will at length thrust forth every thing that is Extraneous, and that should not be there; and yet nevertheless we ought to help Nature (al we can) with attracting Medicaments.

The binding how to be ordered.

But now as for the manner how the binding up of such a like Fracture with a Wound ought to be instituted and ordered, in this neither the Ancients, nor yet the more Modern Authors, do agree among themselves:

for

for some of them are wont to binde up the Fracture, as otherwise they did when it was without a Wound; that so the Wound may be likewise covered; and they also loosen this binding every third day: and some there are that rowl about the Swathes in such a manner, that the Wound is not at all comprehended within them, but left naked; so that we may from day to day use all due means for the curing thereof, without any frequent binding up and loosening of the whole Fracture. Others there are that use fewer Swathes, and bind up the Fracture after the usual and ordinary manner: but then others there be that administer broader and more Swathes; that so by the number of the Swathes they may accomplish that which might have been done with fewer when hard and streightly rowled. And some there are that altogether neglect and disregard the splinters; others there be that make great use of them; and of those that make use of them, some apply them a good distance off from the wound; but others apply them even upon the very wound it self; but then in that part that lyeth upon the wound they make a hole, that so the *Pus* may pass forth thereat, and that such Medicaments as are needful may be applyed thorow the same. *Cæsar Magatus* (in his *B. of Wounds, Chapt. 6.*) insisteth stil in his own Method; and here likewise in this case he hath no regard at al unto the wound; and unless there happen to follow here upon any thing else that may force him to do otherwise he deferreth the loosening until the fifteenth day, and sometimes unto the thirtyeth, according as the quality of the fracture, and the Nature of the wound seem to perswade: and look how much the longer time the fracture requireth for the making of it firm and strong, so much the longer doth he defer the loosening. And (as he writeth) the generating of the *Pus* in the wound doth not at all deter him. For (saith he) if it be cured in this manner, there is then a far less quantity thereof generated by reason of the heat of the strengthning Covering; & as for that which is bred without the wound, he writeth that nature expelleth forth this. And that this may be the more easily done, he openeth and maketh slits (over against the wound) thorow al the linen Clothes by certain small cuttings; thorow which the *Sanies* (or thin excrement) that is bred may be driven forth.

Now although that in such operations and handy-works we may oftentimes in divers and different manners attain unto the same desired end; yet notwithstanding both *Hippocrates*, and likewise all the more Skilful and experienced Chirurgeons, take it for a most certain and undoubted truth, that the first binding ought so to be instituted, that the wound may not be left naked and bare; but that it may be comprehended within the swathe. And therefore the swathe is first of al indeed to be cast upon the Wound itself; for if it be otherwise done, the humors wil be pressed forth from the Superior part downward toward the wound, and many dangerous Symptoms are from thence excited. And the danger of thus doing we may see experimentally even in one that is sound and free from any such fracture. For if in any such person you binde any one part both above and beneath, and leave the middle part untouched, then the said middle part by the Humors that are from the adjacent Members forced and pressed unto them, is lifted up into a Tumor; and from the influx of the Humors (as we see) it soon changeth its color. And albeit that in the first binding the Member shall be all of it wrapt up within the Swathes; yet notwithstanding there will not from hence be any cause to fear the least danger; in regard that for the first three daies there floweth forth but very little either of *Pus* or *Sanies*, that is to say, the thick or thin Excrements. But here also even in this kind of binding it is to be observed, that we are to make use of a Swathe that is somwhat broader than ordinary, and then otherwise when there is no Wound present; and that there be indeed a sufficient compression made; it being then to be accounted sufficient, when it can retein and keep together the bones: but yet it must be somwhat less then if there were present no Wound; lest that the wounded part being pressed together, a pain and Inflammation should thence be excited: and the number of the Swathes may compensate the more loose and easie binding and rowling of them; since that it is far more safe to rowl about the Swathes oftner, then any way to hurt the part by Compression.

On the third day the binding is to be loosened; and then it is again to be ordered after the first manner. And then most fitly and conveniently there may be a hole cut through the Emplaster or Cataplasm that is imposed upon the Fracture; yea and in the midst of the very Swathes there is a hole to be left; (and so also in the Splinters, if there shall be any applied) that so there may fitting Medicaments be administred unto the Wound; and that the Wound may also be throughly cleansed and purged, without any loosening of the Fracture. And this way of binding is lively set forth unto us by *Ambrose Parry*, in his 14. *B. Chapt.* 18. and 23. For whereas the broken bones (that are wont to perforate

perforate the Skin) are not alwaies so sharp (as in those Fractures that are made by the Sword) that together with them the flesh is bruised together, and a hole made through it; which when of necessity it must be turned into *Pus*, abundance of the said *Pus* must necessarily be bred; which if it be reteined (as needs it must, if the Wound be wholly bound up) soon becometh sharp, and so excireth an itching and pain, and divers other mischiefs; although that Nature be strong and vigorous; yet nevertheless the generating of abundance of the said *Pus* cannot be avoided; since that all whatsoever is bruised must of necessity be converted into *Pus*.

And although that *Magatus* doth cut and make little slits in all the Linen that he putteth upon the Wound, that so there may be a free and ready passage for the *Pus*; yet notwithstanding all the inconveniences that proceed from the retention of the *Pus* cannot by this means be prevented. For if those Swathes and Linen Clothes shal not be shifted before the fifteenth, and somtimes even the thirtieth day, they must certainly be very much defiled and polluted by the *Pus* and *Sanies*; whereupon in the wounded part an itching, pain, and exulceration may follow. But then on the other side, if the Swathes be still kept whole, and not at all cut, and thereupon to be loosned every third day; it is then to be feared, lest that the *Pus* reteined may in the mean time excite some mischief or other; and also lest that in so many loosenings and new bindings up again the bones may be removed out of their places, and having been well set and joyned together they should again be depraved and disordered: which may easily be avoided, if the binding be but seldom loosened, and the Wound kept open. And yet notwithstanding as often as the Wound is dressed, it may be covered over with a new Swathe, (which may contain both Medicaments and those Coverings they cal *Splenia*) and may defend the Wound from the external Air; and it may be loosened as often as there is any need thereof; but then indeed it must be without any agitation, shaking, or violent moving of the broken Member.

And there must also no Splinters be applied, lest that they too much compress the Wound, and beget a pain and Inflammation. And if any will needs apply them, yet notwithstanding they are not to be put upon the very Wound, but neer unto the same. Yet the truth is, the number of the Swathes may very well supply the use of these *Ferulæ* or Splinters. And these things are thus simply to be performed, if there be neither any bone naked and bare, and that we fear not the impostumating and falling out of any broken piece and fragment of the bone.

Chap. 3. *Of a Fracture with a Wound, in which there is no bone made bare, and yet nevertheless a Cause to fear the falling forth of some fragments of the broken bone.*

It happeneth oftentimes notwithstanding in Fractures with Wounds that there is no bone at all left naked and bare: and yet nevertheless we may have great cause to fear that some broken bone may impostumate and drop forth: and this is done when the bones are made dry and withered, so that they cannot be agglutinated unto the sound bone; or in a Fracture, when they are so separated from the rest of the bone, that they can no more be joyned therewith. For then Nature endeavoureth to thrust forth whatsoever is troublesom and burdensom unto her, and what cannot be united unto the rest of the bones; neither is she at rest until whatsoever offendeth be wholly expelled out of the Body: and this oftentimes she doth at length perform although it be a long time first.

Now this happeneth, when the bones are either corrupted by the *Sanies*, or else when they are altered by the external Air; or else likewise when they are so separated (in a Fracture) from the rest of the bones, that they cannot possibly be any more conjoyned with them.

Signs Diagnostick.

Now what the Signs are of a bone like to be impostumated, and to drop forth, we are told by *Hippocrates* in his 3. *B. of Fractures, Text* 18. The First Sign is this, that there floweth forth a greater abundance of the *Sanies* (or thin Excrement) then could rationally be expected from the greatness and Constitution of the Wound. Secondly, That the Lips of the wound do not meet together; or if they do at any time meet together, yet they soon seem as it were to be broken, and to be stirred up and provoked to excretion; and they become as it were loose and spungy; and there is perceived in the wounded part a certain silent motion. For Nature doth not entirely heal a Wound, when there is somthing remaining within that cannot possibly be agglutinated with the rest. Thirdly, If the bone be left bare of Flesh, it is then altogether

together a Sign of its separation and dropping forth; in regard that then it may be altered and corrupted by the external Air, and that the Veins and Arteries (which convey the Aliment) can no longer run forth unto it. And Fourthly, It is then likewise a Sign that the bones will fal out, if they be broken and shattered into many smal pieces and fragments: for then they cannot all of them be easily Conglutinated.

Prognosticks.

1. It is a Sign of an *Abscession* instantly to follow, if there be good Flesh bred in the sides of the sound bone.

2. But the time in which the bones are wont to recede and fal forth is various, and not at all times alike. For in those of a tender Age, and in the Summer, and if the bone be not very great, it is twenty, thirty, or perhaps fourty daies, ere the bone will be separated and fall forth. But if the bone be any thing great, in one of a ful and ripe Age, and in the Winter time, it is usually threescore daies, yea and sometimes longer, ere it impostumate and drop forth.

The Cure.

If the bone that is like to fal forth be moved out of its place, and that it stick in the very Wound, it is immediatly (as we told you before) to be drawn forth with the *Volsella* or Pincers; if it may indeed be so drawn forth without any pain and violence: but otherwise the whole business is to be committed unto Nature, which by degrees wil at the length separate that which cannot be agglutinated. And yet nevertheless she is to be assisted and holpen by the Physitian; and therefore the binding ought to be instituted in a loose manner, and often unbound, that so the *Pus* and filth may not be deteined, but that it may freely and easily flow forth. And likewise there are no Splinters to be imposed upon that place by which the bone is like to fal forth, lest that by compression they cause pain.

And so also there are Medicaments to be laid upon the Wound, that have in them a power of drawing forth of the Wound the bones and whatsoever is extraneous and no way belonging unto the part affected; and such Medicaments we have above mentioned in the *place alleadged*.

But if there be some great and extraordinary portion of the bone like to drop forth, and this because that the parts of the broken bone cannot be again composed and made to Joyn with the other; (*for whatsoever bones shal refuse to be replaced, we ought to know that these will separate and fal forth; as also those that are naked and bare of Flesh*; as *Hippocrates* writeth (in his *B. of Fractures, Sect.* 3. *Text* 44.) such like wounded parts are to be handled with all gentleness. For by reason of motion and compression there happen many times most vehement pains; the smal parts of the broken bone not rightly placed together pricking the parts that lie neer unto them, these parts being very sensible of pain: whereupon it is that those bindings that in other Fractures are very convenient, in such Fractures as these would excite most vehement pains.

Now *Hippocrates* (as he tels us in his *B. of Fractures, Section* 3. *Text* 21.) that so he might avoid these inconveniences, maketh no use of the Swathe, lest that he should press together the part too much, and lest if the part should at all be lifted up he might excite pain; but having finished the replacing of the bones, (as far as it may be done) and having taken away all those fragments of bones that may be taken away, he then applieth unto the Wound the pitched Cerot, or some other Cerot fit to be put upon bloody Wounds: and then after he hath thus done, because that there is an imminent danger of a fluxion, from the weakness of the part, and from pain, (and likewise that the flux of Humors may be driven back, the part strengthened, & the Fracture made firm and stable) he putteth round about it those coverings we cal *Splenia*, doubled; or the *Plagulæ* of thin Linen; in breadth half as broad as half the Palm of the Hand, and no narrower; but then in length a little shorter then that they should come twice about the wounded Member, but yet something longer then to compass about but once only. For if they should be longer, then of necessity (when the Medicaments are renewed) the Member must be lifted up: and if they were shorter, they could not then sufficiently strengthen and establish the Fracture. Those Linen Clothes being first throughly moystened in sharp or sowr Wine, and so many in number as are necessary, (that so there may be place without them) are so to be applied unto the Member, that their Heads may be drawn by the place affected, not round and Circularly, but a little sloping, so as that from the Contrary part (where they began,) they may be brought together the one to the other, after the similitude of the letter X. and that so they may cut cross one another like unto the aforesaid Letter, by drawing the right Head unto the left part, and the left Head unto the right part. Which *Splenia*, in regard that they are not very long, and may be taken away, that the part may not be lifted up, in this respect they are very convenient. And

instead

instead of the Wine we may likewise very fitly administer other Medicaments also, which are as good for the very same use.

There may likewise notwithstanding be administred a binding which is compleated with once only rowling about; and it may be performed with a Swathe, which is to be folded together with a twice or thrice doubled Linen Cloth, (after the manner of a Cross cloth) and so very dexterously to be sewed together in their sides; and so broad that it may cover the whol Wound.

But now because that binding by which the bones (when they are again set in their places) are so to be kept from starting out of their said places hath not any being or use in this case, therefore those Wooden Coffers, Pipes, or the like engines are to be administred, that they may keep the broken part in its proper place. And yet notwithstanding this is carefully to be heeded, that nothing that is hard be immediatly applied unto the part; but that betwixt the wounded part and those Engines there be interposed some soft *Splenia* coverings, that so there may be no compression made: touching which see *Hippocrates*, in his 3. *B. of Fractures*, and 23. *Text.*

And Lastly, If the extremities or ends of the broken bones break out and stick forth without the Skin, we are then to do our utmost endeavour that they may not be altered and corrupted by the external Air, so that afterward they must of necessity be cut off; and therefore we must labour that they may forthwith be replaced, and covered with their Natural covering the Skin: which in what manner it ought to be performed, we have told you above in the Second Chapter.

Chap. 4. *Of the Preternatural Affects that happen unto Fractures.*

But now, in regard that there are various Preternatural affects that are wont to succeed and follow upon Fractures, (which partly retard the Cure, and partly remain even after the Fracture is cured, and are to be taken away) we shall likewise treat of these. Now there are many of these like affects, as Pain, Inflammation, and a *Gangrene* following upon this, an Itching, an Excoriation, an Exulceration, a depraved Figure of the Member, a *Callus* either greater or less then what Justly it ought to be, an Extenuation of the Member, tenderness, and debility; touching all which we intend now to speak.

Pain.

If there be any pain present, this is altogether to be asswaged and taken away; for otherwise by reason hereof the Humor will flow together unto the part affected, and so an Inflammation and other mischiefs wil be excited. But now that it may the better be taken away, we are to consider from what Cause it proceedeth, and that (if possibly it may be) is instantly to be removed. And therefore we are to be wel advised, whether this pain be from some bone that pricketh, or from the Swathes too hard drawn; or whether it be from the ill Scituation of the Member; or else from the afflux of the Humors.

If the pain arise from a bone that pricketh, (and this is known by the light and gentle handling of the part, and the pricking pain following thereupon) then the Swathes are to be loosened, and the pricking bone is either to be put back into its proper place, or (if it may conveniently be done) taken forth, or cut off. Touching which *Celsus* thus, in his 8. *B.* and 10. *Chapter. A Fracture* (saith he) *doth somtimes vex the Flesh with certain sharp pricks as it were, which being known by the itching and pricking, it will be best to open it, for there is a necessity of cutting off these sharp pricks.*

If the pain arise from the over hard binding of the Swathes; this is found by the swelling that appeareth in the extremity of the part, and the sick person complaineth that he is vehemently pressed. And then the Swathes are forthwith to be loosened, and the binding to be made more easie.

If the pain proceed from an ill Scituation and posture of the Member, the sick person doth easily discover this; and it requireth a change of the Scituation; which ought so to be ordered, that the Patient may now confess himself that he is without pain.

And Lastly, If the pain be from the afflux of the Humors, the way and means of curing it is the very same with that of an Inflammation in its beginning; as we shall by and by shew you.

Inflammation.

For if there be a pain excited from the afflux of the Humors and an Inflammation follow thereupon; we are then to oppose the very first beginning of the Inflammation, in that manner as we told you above, in the first part, and 5. *Chap.* To wit, the Member that is bound up must be loosened, and fomented with the Oyl of Roses, either alone, or mingled with the white of an Egg: or else such a like Cataplasm is to be laid on.

Take

Take *Barley meal, three ounces; the pouder of Marsh-Mallow Roots, and Camomile flowers, of each one ounce and half; Roses, one ounce; boyl them in a sufficient quantity of Water and sowr Wine; and then add Oyl of Roses, three ounces; and make a Cataplasm.* And for the rest, see in the *place alleadged.*

But before the Inflammation be ceased, the part is not to be bound up, or certainly, (at least) not to be hard bound; neither are the Splinters, nor any one of those kind of Engines, to be imposed; unless it be that they may prop up the member, and contain the Medicaments.

Gangrene.

And there happeneth oftentimes likewise unto Fractures (and especially those that are made with a Wound,) a Contusion of the Skin, by reason of the Inflammation following thereupon; which how and in what manner it is to be Cured we have already told you above, in the 2. *Part*, and 19. *Chapter.*

Itching and Excoriation.

But if from the *Sanies* there be caused an Itching in the Wound, as also an Excoriation, and Exulceration, then Water temperatly hot is to be made use of, that the Sanies may be washed away, and that it may be called forth and dissipated: and there may be likewise taken such Water as is moderately salt, which cleanseth more powerfully.

And afterward let the place be anointed with the white Camphorate Unguent, with the Unguent of Roses, of Litharge, of Diapompholyx, and the like: unto which likewise there may be added the Juyce of Plantane, or Nightshade.

Chap. 5. *Of Distorted and ill set Bones.*

And very often likewise it chanceth that after the broken bones are again made to grow together they receive not their former wonted and convenient Figure, but are distorted and writhed; whereupon the motion of the Member is much hindered, and a lameness or halting caused in the Foot; or else in the Arms their laying hold on any thing is hurt. Now this cometh to pass, either from the unkilfulness and neglect of the Chirurgeon who setteth the bones, and bindeth up the Fracture; or else through the inordinate motions of the sick person.

The Cure.

This evil is Cured (if the *Callus* be new and hath not been bred above six moneths, and the sick person of a ripe age, and strong, and the broken bone not very great, and the action of the Member not much hurt) if the *Callus* be again broken, and the bones rightly fitted and set together. Now this breaking of the *Callus* is the more easily done, if the *Callus* be first for some daies fomented with the Decoction of Emollient Herbs, as for instance, the Roots and Leaves of Marsh-Mallows, Mallows, Figs fat and dry: and then let a Cataplasm of the same Roots and Herbs be afterwards laid on, or else an Emollient Emplaster. Or else you may administer some such Emollient Unguent as this that followeth.

Take *Unguent Dialthæa, one ounce and half; Bdellium, Mastick, Turpentine, of each half an ounce; the Marrow of the Legs of Veal, Oyl of sweet Almonds, Camomile, the fat of a Hen, of each six drams; the Mucilage of Linseed, and Fenugreek, of each one ounce; Wax as much as will suffice; and make a soft Unguent.*

The Callus how to be broken.

The *Callus* being sufficiently mollefied, the Member is by the help of two Assistants to be drawn this and that way, and so to be extended: but then let the Chirurgeon put again into its place that which sticketh forth in the place where the Fracture is; and if he be not well able to do it otherwise, he may then on that part upon which the bones do most rest and incline lay a Tile wrapt up in Wooll, and so by binding of it he may force it back again unto its former seat, and there accustom it to abide: or else let him altogether break the bone, which may be done in the aforesaid manner; or else if the Chirurgeon put the broken Member (in which the Callus is) upon his Knee, and then on both sides press down the bone as hard as he can with both his Hands. And then the Heads of the bones are rightly to be fitted together, and a Convenient Cure instituted for this new Fracture.

But if the *Callus* be now already old and of long continuance, and that it be waxen very hard, and that the Patient be weak, or aged, the best course will be (as *Albucasis* adviseth) not to lay Hands at all upon it, by reason of the dangerous Symptoms that are wont to follow thereupon, in this kind of Cure. For it is much better, of two evils to choose the less; and to be content rather to live yet longer (though deformed and lame) for many yeers, then by a cruel Cure to attract dangerous and deadly Symptoms. Yet it is a thing impossible, (if the *Callus* be old and obdurate) to break it; but if any

will needs attempt it, the bone is more likely to be broken in some other place then where the *Callus* is; and so by this means grievous Maladies will ensue unto the sick person; and as for what he desireth, he wil be deceived in his hopes; for the deformity and writhedness of the Member will not hereby be corrected, since that the Crooked *Callus* cannot possibly be amended.

Chap. 6. *Of Correcting the* Callus *that is greater or less then what it ought justly to be.*

AND sometimes also it so happeneth that there is generated a *Callus* less or greater then what it should be. And indeed the *Callus* is generated less then it should justly be, by reason of the scarcity and want of that thick Aliment whereby the bones are nourished, and from which the sayd *Callus* is bred: and this scarcity of the Aliment is either from too spare a Dyet in the Patient, or from the Patients not using of those meats that are most fit for the breeding of the *Callus*; or from the swathes being rowled on too hard and close; or else lastly, because that the Medicaments administred being over astringent have hindered the afflux of the Aliment.

Signs thereof Now the *Callus* when it is less then justly it should be is known by the touch, by which it is discovered to be but small, and the Member is somwhat weak in its motion; and the above mentioned causes went before.

What to be done, for the breeding of a greater Callus. But now that there may be generated a greater *Callus*, we are to allow unto the sick person a full dyet, and meats that breed a thick and viscid Juice; the swathes are likewise to be loosened, and the part to be plyed with warm water untill it appear to be very red. For in this manner there is drawn unto the part affected a greater store of blood, that so there may be supplyed a more plentiful matter for the generating of the *Callus*. There are likewise Medicaments to be imposed, & Dropacisms (as they call them) that are moderately heating and attracting a more plentiful Aliment unto the place affected. There is likewise to be administred one dram of the Stone *Osteocolla* with the *Water of the greater Comfry* (ground smal upon a Marble) *in Ptisan, flesh broth, or Wine*, which hath a singular virtue to generate the *Callus*; as by examples *Guilhelmus Fabricius* proveth in his *First Century*, and *Ninetyeth Observation*.

The Callus bigger then it justly should be But then somtimes (on the contrary) the *Callus* is generated bigger then what justly it should be; which proceedeth from the over-abundant afflux of the Aliment (especially when it is too thick) as also by the giving of the *Osteocolla* Stone hand over head; which although it hath indeed a notable virtue in generating the *Callus*, yet Nevertheless it is more sutable and convenient for aged persons, and such as are of riper years, then for such as are very young. For if it be administred unto these, there is then generated a *Callus* greater then what justly it should be, as by an Example *Guilhelm. Fabricius* teacheth us in the place before alleadged.

Signs thereof. Now this *Callus* is known by the very touch, by which it is easily discovered; as also by the pain which ariseth from the Compression of the Muscles and the Nervous parts; whereupon the part also is rendered unfit for motion, and especially if the fracture be made neer unto the Joynt.

The Callus how it is to be made less. Now the *Callus* if it be over-great is diminished and made less by discussive and digestive Medicaments; as by frictions of *Sal Nitre*, and *Oyl*, and by a perfusion and fomentation made of Salt water, or a decoction of the *Leaves* of *Beets*, *Mallows*, *Pellitory of the wal*, *Sage*, *flowers of Camomile*, *and of Melilote*; or else a Cataplasm made of these is to be layd on.

Or else let the part be anoynted with this Unguent. *Viz.*

Take *Goose fat*, *Bears fat*, *Mans fat*, *of each two ounces*; *Juice of Earth-worms one ounce*; *Ammoniacum a dram*; *and mingle them.*

But yet if the *Callus* be harder then ordinary, then let Emollients be added unto Digestives; and before the application of Cataplasms let the place affected be fomented with some Decoction. As,

Take *Roots of Marshmallows one ounce*, *Roots of white Lilyes and Bryony*, *of each half an ounce*; *Flowers of Marshmallows*, *and Mallows*, *of each one handful*; *Camomil and Melilote*, *of each half a handful*; *Linseed*, *and Fenugreek*, *of each half an ounce*; *boyl them for a fomentation*; *and of the mass make a Cataplasm.*

But let these fomentations be used, not only until the part wax red, and begin to swel; but that also the part may again fal, and become lank and wrinkled.

Let this Dyet be very sparing; neither let him eat much food that yieldeth a thick and clammy Juice.

Guilhelmus

Guilhelmus Fabricius (in his 1 *Century*, and *Obſervat.* 21.) maketh uſe of theſe Medicaments, for one whoſe *Callus* was grown too great, by the uſe of the *Stone Oſteocolla*. Firſt of all he twice a day fomented the *Callus* with the following Emollient Decoction.

Take *the Roots and Leaves of Marſh-Mallows, Bryony, white Lillies, Bears Breech, Flowers of Camomile and Melilote, of each one handful; Common Worm-wood, and Red Roſes, of each one ounce; boyl them in Vinegar one part, and Water four parts; unto the Conſumption of the third part.*

After this he anointed the *Callus* with the following Unguent.

Take *Mans fat, Bears fat, and Gooſe fat, of each two ounces; the Juyce of Earth-worms, and Vinegar of Squils, of each one ounce; Mingle and make an Unguent.*

After the Inunction he applied the following Emplaſter ſpread upon Leather.

Take *the Emplaſter of Frogs with Mercury, and of the Mucilage, of each one ounce; and mingle them.*

In this manner he proceeded for ſix daies, until he ſaw that the *Callus* was not only much mollified, but alſo moſt manifeſtly diminiſhed. And afterwards inſtead of the Plaiſter he fitted unto it a Leaden Plate, and with a Swathe he bound it faſt and firmly upon the *Callus*. And by the uſe of the Remedies, and the bleſſing of God upon them, the *Callus* was ſoftened, Reſolved, Extenuated, and Depreſſed; and the ſick perſon reſtored again unto his former health.

Chap. 7. *Of the Slenderneſs and Weakneſs of the Member.*

AND furthermore it happeneth oftentimes, that after a Fracture the Member remaineth ſlender and weak: which is cauſed either through the ſcarcity of the Aliment, whiles that by the long and various bindings of the Swathes the Veins carrying the Aliment unto the part are ſtreightened, and welnigh cloſed up; or elſe when the ſick perſon hath not food enough allowed him to Eat and Drink: and that likewiſe which maketh very much hereunto is a long continued reſt of the Member, and its Ceſſation from Motion.

And therefore we muſt by all means endeavour, that a more plentiful Aliment may be attracted unto the part. And therefore as much as is fit the Member is to be moved, and reduced unto its wonted and accuſtomed motions; and to be fomented with Decoctions that only attract the Aliment unto the part affected, and do not any waies ſcatter it. And Dropaciſms are here likewiſe of ſingular uſe. Or,

For broken bones that grow not together as formerly.

Take *Oyl of Coſtus and of Camomile, of each half an ounce; Oyl of Caſtor, and the Martiat Unguent, and Mans fat, of each one ounce; and mingle them.*

And ſometimes alſo it happeneth (eſpecially in aged perſons) that the broken bones will not be brought to grow together again; of which thing *Guilhelm. Fabricius* (in his 1 *Cent. Obſervat.* 92.) hath a Hiſtory. The very like whereunto there happened here of late, in a very learned man, who is yet living. This man was in the very ſame caſe with the other mentioned and deſcribed by *Guilhel. Fabricius*. For he can indeed write with his right Hand; but if at any time he deſire to lift up his whole right Arm (which he had broken) either forward or backward, he then needeth the aſſiſtance and ſupport of his left Hand.

Now this cometh to paſs, if the bones (after they be ſet,) be not kept in their places ſteady and unmoved; and this likewiſe was the cauſe of what happened unto that learned perſon we but even now mentioned. For he being very Fleſhy and Corpulent, and his Shoulder that he had broken being not poſſibly to be bound up in a right manner, and hard enough, and he in the night time ſleeping very unquietly, and continually turning himſelf in his bed; and moreover, by reaſon of his extraordinary ſweating in his Shoulder, the Medicaments applied thereto being continually kept ſo wet and moiſt that they could not ſtick cloſe enough to put forth their virtue, the bones could not be conſolidated, nor brought to grow faſt and firm together, but they lay at a certain diſtance one from the other.

But now ſuch Fractures as theſe are afterward very hardly to be cured, (unleſs it be ſo that they are new and of no long ſtanding, in which the uſual way of Curing is to be adminiſtred, and the *Oſteocolla Stone* to be given the Patient, as we have already ſhewn you how, and in what manner; of which very thing we finde an example in *Guilhelmus Fabricius* his *third Cent. Obſervat.* 90.) in regard that a *Callus* is drawn over the extremities of the broken bones, by reaſon of which the bones can no more be brought to grow together. Yet ſome there are that think that ſuch inveterate Fractures as theſe may likewiſe be Cured. And *Cornelius Celſus* (in his 8. *B.* and 10. *Chapt.*) writeth of them, in theſe very words. *If* (ſaith he) *the Fracture* (*to wit, of the bones that grow not well together*) *be inveterate, the Member is then to be ex-*

tended, that it may be something hurt. The bones are with the Hand to be divided one from the other, that by coming together again they may be exasperated; so that if there be any thing fat, it may by this means be taken away, and that it may wholly become new as it were: and yet great care ought here to be had that the Nerves and Muscles be not hurt. And then the Member is to be fomented with Wine in which Pomegranate Rinds have been boyled; and the same is likewise to be laid on mingled with the white of an Egge. The third day it is to be loosened, and fomented with Water in which Vervein hath been boyled. On the fifth day the like is to be done; and Splinters are to be placed round about it. And as for all the rest that is to be done (both before and after) it is the very same that we wrote before. But this way of Curing is very dangerous, and (which *Celsus* himself likewise feareth) by thus doing the Nerves and Muscles may easily be hurt; and thereupon an Inflammation or Convulsion excited.

Chap. 8. *Of the Fracture of the Arm.*

AND thus much (in general) may suffice to have been spoken touching Fractures. But now because that the bones which are broken are various, and in regard that according to the variety of the broken bones the Cure doth something differ, we shal now therefore speak something of Fractures in their species, and particularly. But as for the rest of the differences, in regard that they make very little or nothing at all either for the knowledg or Cure; and that all that may be said of them is conteined in those things which we have hitherto spoken of Fractures in general; we shall therefore pass them over, and shall treat only of those differences that are taken from the subject, and the diversity of those broken bones. And because that very frequently the Arm, Shoulder, Leg, and Thigh, are broken, we shall therefore in the first place speak of them; and afterwards we intend to treat likewise of the Fractures of the rest of the bones.

The Fracture of the Arm:

And indeed as touching the Fracture of the Arm, in regard that the Arm together with the Hand is the Organ or Instrument of laying hold on things, and of many labors, and is likewise exposed unto external injuries, it is wont to be often broken.

Now the Arm, or that part which is from the Shoulder to the Wrist, consisteth of two bones; of which the greater that lieth lowermost is called *Cubitus* or *Ulna*; but the less which lieth above the Elbow is termed *Radius*. Now somtimes both these bones are broken, and somtimes but only one of them.

Prognosticks.

1. The Fracture of the Arm is more easily Cured when but only one of the bones is broken, then when they are both broken; as we told you above, in the *first Chapt.* and *sixth Prognost.*

2. If only one of these Arm-bones be broken, the Cure is more easie; if the upper bone, (or *Radius*) then if the lower bone (or *Cubitus*) be broken; for the upper needeth less extension then the lower: and if the lower, (to wit, the *Cubitus*) be preserved sound, it serveth instead of a *Basis* and prop as it were, to keep the broken bone from being moved out of its place. And Secondly, Because that it is more easie to be set in its place again; unless it be in that part next the Hand. And thirdly, Because that the Elbow bone being kept safe and sound, it is carried more safely in the Scarf or Linen Swathe.

3. But the worst Fracture of all is, if both the bones be broken together. For first of all, they have no prop, nor any thing at all to sustain them. And then again Secondly, They need a greater Extension; since that the Nerves and Muscles are more contracted toward the place from whence they spring; in regard that there is nothing whereby (when they are extended) they may be so kept. And Thirdly, because that the neer neighbouring parts are more hurt.

4. But now the bones of the Arm are for the most part made to grow together within thirty daies; although (as we said before) there may be great difference in the Age, and Nature of the Patients.

The Cure.

Whatsoever things they are that are required unto the Curing of the Fractures of the other parts, they are here likewise necessary. But as for the Extension, there is less need of strength and force when the *Radius* is broken, then when the *Cubitus* or Elbow is broken: but the greatest need of all, when both the bones are broken. And indeed, if both the bones are broken, the Extension that is made ought to be equal; but if only one of the two bones be broken, the greatest and strongest Extension ought to be in that part where the bone is broken. The Extension being made, the broken bone is again to be directed into its proper place, and there set

set fast. The broken bone being thus replaced, the Fracture (as we told you before) is in a convenient manner to be bound up and rowled about with Swathes; and all other things are here to be performed that were before spoken of in the Cure of a Fracture in general; and then at length the Arm is to be fitly placed and Scituated. And indeed (as *Hippocrates* adviseth in his *first B. of Fractures, Text* 22.) in the placing thereof there is great care to be had, that the Hand be not lower then the Elbow; lest that if the Arm hang down the Blood should flow toward the Fracture; but somthing (and not much) higher then the Elbow; and yet nevertheless so that no pain at al may be caused. And the Arm is also to be placed in that Figure, which may not in the least pervert any of the Muscles, and breed pain. And therefore the Arm is neither to be wholly extended, neither ought it to be wholly doubled and bowed together: neither is it likewise to be placed in a Supine or Prone manner. For these are the four extreme habits; and extension is contrary unto bending and crooking; and so is Supine also contrary unto Prone. But now, there are also two other manners; one that betwixt extreme bending and extension (called *Angularis* by *Hippocrates*) the other between prone and supine. And alwaies, if the Arm be rightly placed, the Muscles that arise in the fore part of the Elbow will be wholly Scituated from the interior part; and those that are from the exterior part will likewise be conteined in this; and so there will not be at all any extension or perversion of the Muscles. And indeed, the Arm being thus bound up and Scituated, it will be very fit that the sick person keep himself in his bed for ten daies. But after this, in regard that the sick person will not be willing any longer to keep his bed, but wil now desire to walk about; from the Neck the Arm is to be hung in a broad and soft Garter or Scarf, equally sustaining within it good part of the Arm, with part of the Palm of the Hand, so, that none of the bones that are set and joyned together may by any means be moved out of their places.

Chap. 9 *Of the Fracture of the Shoulder.*

Prognosticks.

The Shoulder bone grows together in fourty daies: for it being somwhat a great bone requireth the longer time for the generating of the *Callus*.

The Cure.

And therefore the first care (as in all Fractures) ought to be, that the broken bones may be restored unto their own places; and being joyned together, that they may be so preserved. That this may be the better performed, there will first of all be need of Extension; which how it ought to be done in this Case, *Hippocrates* hath accurately described in his 2 *B. of Fractures*, and *Offic. Medic.* The Sum of all is this; that the sick person either sitting or lying along be kept so steady and immoveable, that he may not be stirred so as to give ground in the Extension of the part: and let the Shoulder be kept in about the upper part of it, and the broken bone drawn this and that way. Now if this cannot be done (in those that are of ful and ripe age) by the help of the Hands alone (by reason of the thickness and strength of the Muscles in that place) then there wil be need of Engines and Cords; of which *Hippocrates* (in the *place alleadged*) maketh mention. The Extension being performed, the bones are conveniently to be set and placed together; which may here be done without any difficulty. Unto the broken bones set right and straight fit Medicaments (touching which we have spoken before, in the first Chapt.) are to be laid on; and afterward Swathes are to be cast about it, beginning from the Fracture it self: and here we are to be very heedful, that the Member be evermore bound up in that Figure in which it ought to remain; that is, that the Elbow with the Shoulder may make a right Angle, lest that in changing the Scituation the Swathe press too close in one part, & be overloose in another, and so the bones be perverted. *Hippocrates* bindeth on the Splinters the seventh or the nineth day, because that in the Shoulder by reason of the greatness of the Muscles (by which it is conteined) those bones that are about the Fracture in a longer time become altogether slender and loose: for then at the length we come most fitly unto the applying of the Splinters. But we must have a care that these Splinters touch not the extremities of the Joynts; and therefore (as *Celsus* in his 8. *B.* and 10. *Chap.* telleth us) they ought on the outside to be very long, somwhat shorter from the brawn of the Arms, but shortest of all under the wing of the Shoulder. But if the Splinters be instantly fastened on at the very first of all (according to the practise of some, and indeed most of the Modern Artists) they ought then to be tied on but loosely; but then after the seventh and nineth day they are afterward to be loosened, and bound on somthing harder. And then in the

the last place the Member is rightly to be placed; and that the Shoulder may not be perverted and turned awry, let the broad Swathe that encompasseth the Shoulder be drawn in a round manner about the Breast; and when the Shoulder ought to rest, let the first many times wrapped about be cast and drawn under betwixt the side and the Elbow, lest that the Shoulder touch upon the side; but yet let there be a space in the middle, whither when the Shoulder is forced by the Reins drawing it into the breast, it may not at all be depraved and disordered. Let the sick person lie upon his back, putting his hand upon his Stomack; and let soft pillows be put under the Shoulder, that so it may not remain hung up as it were; but the Elbow is to be lifted up by a Scarf put about the Neck, that so the Angular Figure may be preserved, and that it may not be moved whilest the Patient sleepeth.

Chap. 10 *Of the Fracture of the Leg.*

THe Leg is that part that is extended from the Knee unto the Foot. Now it consisteth of two bones: of which that which is the thicker, and is Scituated in the inward part of the Leg, we call *Tibia* or the Shinbone; but the thinner and outward bone is termed *Fibula*. Now these bones are broken, somtimes both of them together, and somtimes but only one of them; and the Fracture happeneth either in the midst, or in the upper, or in the nether part.

Signs Diagnostick.

If both the bones be broken, this is most easily known; because that the whole Leg may then be bowed and bended. And it is likewise no hard matter to know the Fracture of the shinbone, if it be wholly broken; because that this whole bone cometh easily to be seen as being in a place where there is but little or no flesh. But if the *Fibula* only be broken, this is not so easily known, because that it is covered with much flesh; and yet nevertheless the broken part inclineth inwardly.

Prognosticks.

1. If only one of the bones be broken, the Cure is then easier then if they be both broken.

2. If the *Fibula* only be broken, it is more easily Cured; and the sick person will be sooner able to set his Foot to the ground, in regard that the Legs are easily extended; and because that the Shin-bone susteineth the greatest part of the weight of the Body.

3. If the Shin-bone be broken, it is very hardly Cured; because that there is here need of a greater Extension; and the sick person is much longer ere he dare adventure to walk.

4. But now these bones for the most part are consolidated within fourty daies, and very seldom sooner.

The Cure.

And therefore, whether only one, or both the bones be broken, the Leg is (as much as may be) to be extended; that so the bones without any damage at all may again be restored unto their own places, and there joyned together. Which most commonly is to be done by two strong able men; who are to draw the Leg toward them, they standing on both sides of the same; one into the superior part, and the other into the inferior part. And it will be but a Vain-glorious act in them to make use of any kind of Engines, when the Case doth not require it. But if they cannot accomplish it otherwise, let them then make use of the Reins and Engines that we so often have described, and which are so generally well known. And when the Leg shall be sufficiently extended, the broken bones are then to be setled in their places. And afterward convenient Medicaments are to be imposed; and the Leg is then to be rowled and wrapt about with Swathes, (as in general we have already told you;) which ought to be both broader and longer then in the Arm: and the Leg is so altogether to be Scituated and composed, that it may not be turned awry unto any part; and that the broken bones may not be disordered when he goeth to his bed, or to ease Nature. Touching the Scituation of the Shank or Shin-bone, see likewise further hereof in *Guilhelm. Fabricius* his 1. *Centur. Observat.* 93. And at length the Leg when it is extended and stretched forth straight, is to be placed upon a Cushion, or some other soft and plain thing, and so the Splinters and Pipes are then to be administred as in general we told you before, in the *first Chapter*; in which thing we are to observe, that they be not applied upon the extremities of the bones sticking out; or upon that Tendon which tendeth and passeth along from the Leg unto the Foot, and is there knit unto the Heel. For these parts having in them a very exquisite sense will not endure compression; but if they be prest together they are then pained and inflamed.

And there is here also somtimes need of blood-letting, and purging, as in the Fracture of the Arm.

As

As for matter of Dyet, we ought altogether more and longer to extenuate the body of the Patient (as *Hippocrates* commandeth) when the Legg, then when the Arm is broken; by how much that is greater and thicker then this; and becauſe there is alſo a Neceſſity that the body ſhould reſt, and lye ſtill.

Chap. 11. Of the Fracture of the Thigh.

THe Thigh bone of all the bones in the body of man is abſolutely the biggeſt, thickeſt, and longeſt; and this may alſo chance to be broken, either in the midſt, or in the Extremityes thereof, and the places neer adjoyning.

Prognoſticks,

1. Touching the Fracture of the Thigh *Celſus* in his eighth Book and *Chap.* 10. writeth thus: *If the Thigh be broken, it muſt of neceſſity be made ſhorter; becauſe that it never more returneth into its old place. But yet notwithſtanding there is much more weakneſs in the Thigh, where the Negligence of fortune is likewiſe added unto the fracture.* Which opinion of *Celſus* is (according to *Peccetus* in his fourth Book, *Chapt.* 24.) thus to be underſtood by us not that by no means the broken bones may be reſtored unto their wonted ſeat in the Thigh, and there be wel fitted together, that therefore the Thigh bone muſt neceſſarily be ſhorter; but when the part is leſs diſtended then need requireth, and when the bones are not wel and moſt exactly ſet and fitted together: ſince that we ſee from day to day Many who have ſuffered a Fracture of the Thigh (it having been wel faſtned together with Iron inſtruments) have yet walked ſtraight & upright without any lameneſs at al. And the very ſame we are taught by *Avicen*, *Book* 4. *fen.* 5. *tract.* 3. *Chap.* 14. by *Guido* de *Cauliac.* in his 5 *tract. Doct.* 1. *Chap.* 7. by *John de vigo*, in his *ſixth Book and* 14. *Chapt.* by *Andreas*, in his ſecond B. of *Chirurgery, and* 14. *Chapt.* and divers others. But *Guilhelm. Fabricius* (in his 5. *Cent.* and 86. *Obſervation*) writeth that he never ſaw nor knew any that after this kind of Fracture eſcaped without a lameneſs, beſides one young Mayd only, unto whom he adminiſtred a new and peculiar kind of Cure. And this eſpecially happeneth if the Thigh be broken nigh unto the Hip. And of this kind of Fracture the Authors alleadged are to be underſtood: But if the Thigh bone be broken toward the knee or in the midſt, & that there be diligence uſed & care taken in the curing thereof, the fracture may then be healed without any great difficulty, or lameneſs. But that if the ſayd thigh bone be broken toward the Hip, lameneſs for the moſt part followeth, theſe are the cauſes, as *Guilhelmus Fabricius* reckoneth them up. The firſt is this, becauſe that the Thigh bone is not ſtraight, as the ſhin and Arm bones are, but that it is naturally dilated into the external part, as it were into a bow: wherefore if it ſhal chance at any time to be broken it is eaſily bowed and bended toward the inward part: but then toward the external part it bunche th forth as it were into a bow. Secondly, there are preſent the greateſt and ſtrongeſt Nerves and Muſcles from the inward part of the Thigh, which ſo ſoon as the bone is broken they drawing, the ſaid bone (which as we have ſaid was now before naturally bowed) toward their original, (to wit, the place where they have their firſt beginning) do eaſily and in ſuch a manner indeed draw it into a bow, that the extremityes thereof about the Fracture do disjoyn themſelves, and ſtick forth toward the external part. Thirdly, becauſe that it is but one only bone, wherefore it is not ſo eaſily to be detained in its own place, as if it had ſome other bone adjoyned with it, as the ſhin and the Arms have. Fourthly, becauſe that the part is very fleſhy, and the bone ſituated as it were in the midſt of a pillow, experience teacheth us that it can very hardly be kept in its own proper place by the benefit of the ſplinters, and the *Splenia* Coverings; and eſpecially if the Fracture be made obliquely. For thoſe very ſtrong Nerves and Muſcles do again (notwithſtanding that they were from the very firſt rightly ſet and replaced) draw the bones out of their proper places. But yet nevertheleſs, if any one wil follow that Method propounded by *Guilhelm. Frabricius* himſelf, he writeth that it may very eaſily be avoided, that the Leg ſhal not at al become ſhorter, or that any lameneſs follow thereupon.

Whether the Fracture of the Thigh do neceſſarily cauſe lameneſs.

2. The Thigh will at length in fifty days be brought to grow together again, and to be Conſolidated, and not ſooner; in regard that (as I ſayd before) it is the greateſt of all the bones, and therefore requireth the longer time that the *Callus* may be generated, by which it is brought to grow together.

The Cure.

The Thigh bone being broken, if the bones be removed out of their places, there will then be need of a very ſtrong

strong and forcible extension; since that the Muscles that encompass about the Thigh are the greatest of all the rest, so that these strong Muscles (when they are contracted toward the place of their original) may easily overcome and master those bonds by which the Extension is made: which if it should so be, the Leg is thereby rendered shorter; which is altogether a great deformity, and very much inconvenient. For although the Arm be somwhat shorter, yet it may be concealed, neither wil there be any great hurt thereby; but the Thigh if it be made shorter it unavoidably causeth a lameness, and unseemly halting.

There being made a sufficient extension, the Muscles (being of all other the strongest) do easily draw up the lower part of the broken bone unto the upper parts. But now nevertheless that this may the more rightly and decently be done, (a sufficient extension being made by the parts of the Palms sticking forth, as in al other Fractures) let the bone be set directly straight, and so pressed close together. And afterward, let a Necessary and fit Medicament be imposed thereon, and the Fracture conveniently be bound up: and here it wil not be amiss to cut in pieces some linen Clothes, and to wrap them round about upon the Hip, and neer the *Ilia* Guts, as likewise the Groins, and that which is betwixt the Arse and the Genitalls; as for other Causes, so likewise more especially for this, to wit, that the external Splinters offend not the naked part.

The Pipe of what kind it must be.

The Pipe that is fitted unto the Thigh ought either to take in the whole Thigh, or else not at al by any means to be administred. For if the Pipe that is fitted thereto be any whit shorter then that it reach even unto the Ham, and beyond it, it will bring more hurt then help thereunto: for it cannot be prevented, but that upon the motion of the body, or the Legg, the Thigh also must be moved. The Pipe will also be very troublesome unto the Ham, and it will suffer the Knee to be bowed. And therefore if any bend the Knee, there is a Necessity that the Thigh bands be likewise therewithal moved, and the Muscles figured in this and that manner, and the broken bones moved out of their places. And therefore it seemeth to be the most expedient course, that the Thigh be al of it conveyed into the sayd *Canalis* or Pipe, which is to reach from the Hip even almost as low as the Foot. But now this Pipe is at a fitting distance to be bound on with many bands both unto the Thigh and Legg; and on both sides woollen Clothes are to be applyed, that so the Member may not decline unto either part; and this is altogether to be done, that so the whole foot, (to wit, the Thigh with the Legg and foot) may lye along softly and without pain; but yet so firmly, that the sick person may not either through impatience, or whilest he sleepeth, move the same.

For it is to be observed, (as well in the Fracture of the Thigh as of the Legg) that the bottom of the heel be kept in as much as may be, and rightly placed: for if the foot hang down, and the rest of the Legg be supported and propped up, there is a Necessity then that the bones should be seen to stick out in the fore-part of the foot: but if the Heel be placed higher then what is Just & fitting (the rest of the Body being gently lifted up,) the bone in the fore part of the Legg will necessarily shew it self more flat then what is Just and meet; and this so much the more, if the Mans heel be naturally greater then ordinary.

And this is likewise (in the Fracture of the Thigh and Legg) to be taken notice of, that if by reason of the swathes, or the binding on too hard of the splinters, or else from any other cause, there arise in the Ham, or the parts beneath it, a swelling greater then what might Justly be expected; then that which is too streight and close, & presseth the part too much, is to be loosned; but the swoln part is to be fomented or anoynted with those things that have in them a virtue of asswaging pain, as also of digesting and gently driving back the humor; such as the moist and oyly wool, throughly wet in wine and oyl; or the like Medicaments.

But yet Nevertheless, (as already hath been sayd) in regard that although this cure should in this manner be accomplished, lameness and halting doth for the most part follow thereupon; therefore *Guilhelm. Fabricius* (in the place alleadged) propoundeth a new and artificial way and Method of Curing the Fractures of the Thigh, declaring it by an example; and withal he writeth that he had reduced the way of curing the Fracture of the Thigh (which hath alwaies hitherto been accounted most difficult) unto that facility, that even any Novice or young Practitioner may without any hesitation or doubting cure such a like Fracture, if he wil but use a little diligence, and be but provided of fit Instruments. But now as for that way and Method of Curing (together with the Instruments described and delineated to the life, we refer you for a sight of them unto the place alleadged.

CHAP.

Chap. 12. *Of the Fracture of the Nose.*

AND theſe bones, to wit, of the Legg, Thigh, Arm, and ſhoulder, are thoſe that are more frequently broken then any other. But yet nevertheleſs it ſo happeneth ſomtimes, that other bones may alſo be broken; touching all which we ſhall now proceed (in our progreſs) orderly to treat of them all, even from the Head unto the foot.

The Fracture of the Noſe

And firſt of all, as touching the Fracture of the Noſe; this may happen many ways, as *Hippocrates* teacheth us, in his Second Book of the Joynts, and 37. *Text.* For either a part of it may be broken off, and yet notwithſtanding the Noſe it ſelf is ſtil kept that it neither hang downward, neither be turned and made to ſtand awry, or that either of theſe ſhould happen; and this either in that part that is Griſtly, and ſticketh forth; or elſe in the reſt of it which is kept and held together with bones. And ſomtimes alſo even in the very midſt of the Noſe (where it is ſharp) the fleſh neer unto the bone is bruiſed and battered, or the bone is likewiſe ſomwhat hurt, but yet not much: and now and then alſo a wound happeneth unto the Fracture.

Prognoſticks.

1. The Noſe of all the parts of the body is moſt eaſily ſet together again: and if it be not forthwith ſet right and ſtraight, it will not at all be ſet right and ſtraight, but that it will ſtand awry.

2. In the Noſethrills a *Callus* is ſoon bred, and increaſed; for the Noſe (unleſs it be corrupted) is in ten days healed, as *Hippocrates* tells us in his ſecond Book of the Joynts. But others notwithſtanding there are that ſay it is not to be done in leſs then eighteen days; and others aſſert, that it is not done in leſs then twenty dayes time: which difference happeneth according to the ſeveral conſtitutions of bodyes. For Nature differeth from Nature.

The Cure.

If therefore the broken Noſe be equally beaten down unto the inferior part, and be rendered flat; then ſomething is to be put into the Noſethrils that may ſet it up ſtraight again, as the Probe or ſearching inſtrument, or the inſtrument they call *Spatha*: or elſe that which is broken is to be lifted up with the finger thruſt up into the Noſethrils, and ſo to be reſtored unto its Natural ſituation, and place. And outwardly likewiſe we ought on both ſides to lay hold on the Noſe, and to draw it upward.

But then, that the bones of the Noſethrils (that are again brought unto their wonted form and figure) may be preſerved in their Natural ſeat, either Liniments folded together, or the ſhavings of Linen (commonly called Lint) or elſe ſome ſuch like thing wrapt up in the Linen, or Leather, or a leaden or ſilver pipe covered over with a ſoft skin, are to be put up into the Noſethrills. But if the noſe be broken only in one ſide of it we ought then alſo to ſet it right & ſtraight (in a Convenient manner) from that part which declineth, and ſo to reſtore it unto its natural ſeat; both by thruſting in the finger, or ſome fit Inſtrument, into the Noſethrills (in that place where the Noſe is hurt; as alſo by ſetting the Noſe ſtraight outwardly. But then, leſt that bone which is compoſed and ſet together again in its due place ſhould again be depraved, and fall down; there are to be thruſt up into the Noſethril that is hurt either Linen raggs, or a great Gooſequill anoynted with a Gum, and covered over with a ſoft skin, or a pipe or plummet of Lead, or little ſtaff of ſilver, wrapped up in a ſoft Skin. Neither is it much material what it is we thruſt up into the Noſethrills; only that it be ſomthing that may keep the broken bone of the Noſe from falling down; and that it be ſomewhat that is ſoft, and free from an offenſive ſmell. Neither are ſpunges alſo (or the like things) to be put up into the Noſethrills, in regard that by ſoaking in the Moiſture of the Noſe they become thick, and are dilated; and ſo being dilated they diſtend the part, and again move out of their places the bones after they have been wel ſet together. That which is put up ought to be anoynted with ſome emplaſtick Medicament, of *Mannathuris* or the *fine flour of Frankincenſe, Gum Tragacanth, Maſtick and oyl of Roſes.*

But if the Noſe be broken, and writhed in an oblique manner neer unto the Griſtle, then we muſt agglutinate unto the Noſe (in that part into which it inclineth) a little loop or fillet (of a fingers bredth) with that kind of Glew which we mentioned before, touching the dry future or ſtretching in Wounds; and afterward it is to be ſtretched forth, as much as ſhall be thought fit, that ſo the Noſe may be ſet ſtraight again. But let this fillet be ſo long, that it may afterward being drawn below the Ear be drawn likewiſe about the Head: and as for the two ends thereof, we may agglutinate them unto the forehead. For this Rein will juſtly ſet ſtraight the Noſe, and it may be either ſtreyned or ſlack-

ned, according as we find occasion. And if the Tents that are put up into the Nosethrils do stir up and cause any pain, they are to be taken from thence; and all this while the Nosethrils are to be kept straight with the Reins aforesaid. But after the fourteenth day the Reins are to be removed, and a Cerot to be laid on, and care taken that the *Callus* do not grow forth more then what is just and fit.

If the bones of the Nose shall be broken and shattered into smal pieces; we are then (as much as may be) to put them all, and each particular of them, back into its proper seat; or else they are to be driven back by Instruments fit for that purpose; neither must we easily admit of the taking forth of any bone, and not at all, if it may by any means be agglutinated, in regard that it breedeth deformity. And afterward some Cerot or some other Medicament is to be imposed, for the confirming and strengthening of the bones.

If a Wound shal happen with the Fracture, then some Emplaster that is fit and convenient in bloody Wounds is to be laid on: and such like Wounds are most easily Cured of any.

If any Ulcer begin to breed within the Nosethrils; then tents anoynted with fit and proper Medicaments are to be put up into them; and by all means care must be taken that there grow forth no flesh within the Nosethrils. For which end likewise very useful is the Leaden Pipe put up.

The binding up of Fractures.

Touching the binding up of these Fractures Authors differ much; and of these, some of them allow of these bindings up, but others altogether disapprove of them. And indeed it seemeth altogether more safe wholly to omit these bindings up, and the Swathes; seeing that either they perform nothing at all, if they be loose; or if they be harder and closer drawn together, they then set the Nose awry, and make it flat; and very easily may the broken bones of the Nose be kept fast in their places by convenient Emplasters, without any binding up at all. And in no other case doth this binding seem convenient, but only in this, if in the middle of the Nose (where it is sharp) the flesh be brussed about the bone, and the bone stick forth; that so the Nose being pressed together in that part may acquire its own Natural Figure again. But here also, as for binding, although it seem altogether necessary, and very profitable: yet nevertheless we deny it to be at all necessary, since that a Cerot or an Emplaster may suffice. And if at al it be requisite to apply the Swathe, it is to be cast upon the middle of the Nose, and both the ends thereof are to be tied together at the hinder part of the Head.

Ambrose Parry useth this:

Take *Frankincense, Mastick, Bole-Armoniack, and Dragons blood, of each half an ounce; Roch Alum, and Rosin of the Pine, of each two drams. Let them be very finely poudered, and then incorporated with the white of an Egg.* See more hereof in *Hippocrates* his 2. *B.* of the *Joynts*, from the 36. to the 46. *Text.*

Chap. 13. *Of the Fracture of the Jaw Bone.*

AND sometimes also the lower Jaw is broken; and this is very easily to be known.

Prognosticks.

1. If the bones of the Jaw have not an Inflammation happening unto them, even from the very beginning, they are then consolidated within twenty daies, and the Teeth remain entire and safe.

2. But if the Cure be long delaied, the Teeth may be vitiated, and rendered unuseful.

The Cure.

If the Jaw Bone be so broken transversly, that yet notwithstanding the bones stick together one to the other in any part, we ought with the Fingers on both sides (to wit, as wel those that are put up into the Mouth, as those that are outwardly applied) to press the bone together, and so to force it into its own seat again. But that the Jaw Bone is again restored into its own place, appeareth by the equality and evenness of it, and of the Teeth.

But if the whole Jaw bone be broken in a transverse manner (which nevertheless very seldom happeneth) and so that indeed bone stick out upon bone, and that one Tooth stand out upon the next Tooth unto it, then by putting the Fingers into the Mouth, and likewise by applying the Hand externally, the broken bones are to be set in their places again: and unless it may be done by a single & simple compression, there ought first of al an extension to be made (the Physitian extending it before, and some assistant that helpeth him keeping of it back) and afterward the bones ought to be set and Joyned together. It is a sign that the Jaw bone is rightly set and replaced, if we see that the Teeth are

again

again restored and disposed of unto their former Natural Situation.

The Teeth which have been moved and loosned in their holes are with a Thread of Gold, Silver, or Iron, to be Joyned and fastned unto those that stand next them; until they shall again become firm and stable in their places.

These things being thus performed, some Medicament that is fit and proper for the Fracture is outwardly to be applied unto the Jaw bone, that so the broken bones being now set together again may be firmly fastned in their seats; and externally we are to apply a Splinter of Leather or some other convenient matter, answering in length unto the Jaw bone. And after this a fit convenient binding is to be instituted; which is done with a Swathe slit at both ends, two Fingers broad, and in the middle part of it cut also long waies, that it may on both sides take in, and contain the Chin. And therefore there being four Heads of the Swathe thus slit at both ends, the two lower of them are to be brought and drawn along unto the top of the Head, and there to be tied together or sewed unto the sick persons night Cap; but the two uppermost are transversly to be drawn unto the lowest part of the Head behind; or else to be sewed likewise unto the same night Cap.

Let not the sick person lie upon the broken Jaw-bone, but upon that Jaw-bone that is sound and unbroken; and yet nevertheless let him not rest himself thereon, but rather upon his Head, lest that the Jaw-bone that is set in its place be again distorted and made to stand awry. Let the Jaw likewise be kept immoveable; and therefore let not the Patient speak much, neither chew hard Meats, but let him be nourished with Food that is soft and moist, until the *Callus* be hardened. If any thing shall be observed to be again removed out of its place, on the third day the binding is to be loosened; and if any thing be fallen out, it is again to be replaced.

Chap. 14 *Of the Fracture of the Channel bone, or the Bone of the Throat.*

Hippocrates (in his *B. of the Joynts*, Text 62.) reckoneth up six Differences of the Fracture of the Channel bone. For either this bone is broken in a transverse manner, or else long waies. If transversly, this happeneth either neer unto the Joynt of the Shoulder; or else it is broken more toward the breast bone; and furthermore, the Throat bone is either so broken, that that part which is from the breast is carried upward; but that part which is from the top of the broad bone of the Shoulder is carried downward; and this very often (and for the most part) happeneth: or else on the contrary, that part nigh unto the Shoulder blade is carried upwards; but that which is neer unto the Breast is carried downward; and this very rarely happeneth.

Signs Diagnostick.

Now this Fracture of the Channel bone is known rather by the touch, then by the sight; as also by the pain.

Prognosticks.

1. If the Channel bone be broken transversly, it is the more easily Cured; if long waies, it is the harder to be Cured. For that which is transversly broken may easily (by extension, and the compression of the Fingers) be brought to return unto its Natural seat; but the other Fracture (that is in the length of the bone) hath evermore somthing that sticketh out, which can very hardly be fitted together. And then again, because that the Throat bone cannot be so wrapped round about with the Swathe, that what is cleft and broken in the length of the Bone may be again compelled into its own seat; but on the contrary, that which is broken transversly is more easily by the Ligature to be forced back into its own seat again.

2. The Fracture of the Throat doth indeed nothing at all hurt the Commissure of the Shoulder, or any other part: and yet nevertheless because that (although the utmost diligence shall be used) the Neck and the Throat cannot (as the Arms and the Legs) be closely wrapped about with the Swathe, the *Callus* therefore leaveth a very great deformity; because that in a thin bone the *Callus* doth easily become greater: but it is only in the beginning that it seemeth deformed, while it is yet new; but in process of time, when we are once accustomed thereunto, the deformity seemeth the less.

3. But the Throat-bone doth easily grow together again, like as do other thin bones; and indeed in twenty daies at the very utmost it is Ferruminated.

The Cure.

But now that this Fracture may be Cured, there are necessarily required two able assistants, for the extension of this Fracture; of which, let the one with both Hands draw back unto the hinder part the Shoulder that lieth neer unto the broken Channel bone;

and let the other quite contrary draw rather toward him the opposite Shoulder, or the opposite part of the Neck; that so the extension may be made. Which so soon as it is done, let the Chirurgeon with his Fingers restore the broken bones unto their places again, by pressing together with his Fingers that which sticketh up too high, and by lifting up that which is pressed down; or by restoring it back again into its Natural seat, in any manner whatsoever that shall be thought needful. Some there are, who to Facilitate the restitution of the bone, do put something that is round under the Arm-pit of the sick person, that it may fill up the Cavity thereof; and then withal they greatly press the Elbow unto the Ribs; and so by this means they again restore the bone unto its own place. But if the extremities of the broken bone be so depressed that they cannot in this manner be brought back again upward, then the sick person is again to be laid flat upon his Back upon a hard Pillow or Cushion put under his back-bone between the Shoulder-blades; but the Shoulders are by the strength of the Hands lying upon them so to be pressed down, that the extremities of the broken bone that are depressed may be lifted up so high, that they may again berestored unto their own Natural Scituation.

But if the Channel bone be broken and shattered into many smal pieces, and that some fragment thereof cause a pricking in the flesh, and difficulty of breathing; then there is an incision to be made in that part of the flesh, and the fragments to be taken forth; or the sharp pricks are to be cut and shaved off; and the bones when they are made plain must be joyned together; the Lips of the Wound are likewise to be drawn close together, and some Medicament proper for the Fracture (and which may withall resist and hinder Inflammation) is to be laid on. But if there be found to be many fragments of the bone, (the Skin remaining entire and sound) that yet are not sharp, neither do at all prick, then a Splinter is to be provided of Leather, or some other convenient matter, and being anoynted with a fit Medicament it is to be applied unto those fragments.

The broken Channel bones being rightly set together, some Medicament fit and proper for the Fracture (such as are above propounded in the *first Chapter*) is to be imposed. After this three Coverings of a convenient thickness and length (so that they may fil up the Cavity or hollowness both above and beneath the Channel bone) are to be provided; of the which two of them are to be put upon the sides; but the third that is thicker is to be imposed upon the Fracture sticking forth. For so by this means both the broken bone that sticketh out will be depressed, and the broken bones so kept in, that they shall not be moved either upward or downward; neither shall these broken bones (being once set together) be removed out of their proper places unto the sides. And after this a right binding up is to be instituted, which may be done with a Swathe as broad as the Palm of the Hand (or four Fingers breadth) of a sufficient length, having a double Head; it is to be made Cross wise, in the form of the Letter X; which is rather to be often drawn about the place of the Fracture, then that the said Fracture should be too close and hard bound; and it is so to be rowled about, that it may draw the Arm unto the hinder parts. And the Cavity also under the Arm-pit neer unto the part affected is to be filled up with Linen Clothes folded together. For so the sick party will the better and more easily endure the binding. The sick person must also be ordered to take his rest, and to keep himself as quiet as he can; and he himself is to bend back his Arm toward the hinder parts. But let not the Swathe be loosened before the seventh day, unless an Itching, or some urgent Cause require it: and if it be from day to day to be loosened, it may likewise be daily drawn a little closer and harder together.

Chap. 15 *Of the Fracture of the Shoulder-blade.*

THe Shoulder-blade (by the Greeks called *Omoplata*, but by the Latines *Scapula*, or that Triangular bone, neer unto the *Vertebræ* of the hinder part of the Neck, and adhering unto the Back and Breast, not by any Articulation or Joynting, but only by the intervention of the Muscles, and before Joyned together by Articulation with the fore part of the Shoulder and the Throat; touching which see more in the Anatomists) may be broken in any part of it; but yet notwithstanding more rarely in that process that is termed *Acromion*; but oftentimes in the part that is nigh unto the *Spina* or Back bone; and in all other its Extremities.

Signs Diagnostick.

If the *Acromion* be broken, this is perceived both by the sight and touch, and a certain unevenness is likewise easily to be discovered; especially if we compare together the found and unfound part. If a broader part thereof, or any part in its extremities be

be broken, then there is by the touch discovered a certain Cavity; and there is perceived likewise a pricking pain in the part; but a kind of stupidity and benummedness seizeth upon the Arm stretched directly forth.

Prognosticks.

1. The Fracture that is in the top of the Shoulder or the *Acromion* is more difficultly Cured, then in any other parts of the Shoulder-blade.

2. If the Fracture be in the Neck of the Shoulder-blade, or in the dearticulation of the Shoulder, it is then hardly ever to be healed. For in regard that neer about this Joynt there are the Veins, and Arteries of the Arm-pits, and the Nerves arising from the *Vertebræ* of the Neck behinde, an Inflammation and most grievous Symptoms do happen.

3. The Shoulder-blade bone broken is usually consolidated within twenty four daies.

The Cure.

If the broken bone adhere still unto the Shoulder-blade, it is then by the Chirurgeons Hand to be restored back again into its proper place. But if this may not easily be done, and that there be need of more force and strength, then a bal of Linen may be put under the Arm-pit, and let the assistant draw the shoulder downward, by drawing about the Elbow unto the Ribs; but let the Chirurgeon himself with his Hand press down the Fracture, and set the bone that is broken. But if the broken bone do not cohere with the Shoulder blade, but that it only yet hangeth thereunto by the Ligaments and the *Periostium*, and that it exciteth no great danger by pricking, it is then also to be restored even unto its own place again. But if the broken bones be altogether separated both from the Shoulder blade, and from the *Periostium* also, and the Ligaments, and prick the flesh, the Skin and the Flesh ought then to be cut, and the fragments to be taken forth. But if they prick not, they are then to be left remayning. For Nature at length expelleth of her own accord that which cohereth not with the rest; although it be sometimes long ere this be done; like as *Ambrose Parry* (in his 14 *B* and 9. *Chapt.*) relateth, that a certain Marquess had after seven yeers time certain fragments of bones breaking out of his wounded Shoulder-blade, the Cicatrice being opened. The bones being rightly set in their places, fit Medicaments are to be imposed upon the Fracture, and a Convenient binding is to be instituted; and if the top of the Shoulder be broken, a Linen ball is then to be bound under the Wing thereof; and the binding is not to be loosened before the seventh day, unless there happen something else. Let the sick person lie on the opposite side; and let him (all he can) keep the part in quietness.

Chap. 16 *Of the Fracture of the* Sternum, *or* Breast-bone.

THe *Sternum* (or Breast bone) it self is sometimes broken, either by a fal, or by a blow.

Signs Diagnostick

Which is known from the pain, and especially, from the inequality, which is discovered by the touch; and at the compression of the Fingers the broken bone retireth inwardly; and there is a certain sound or noise heard; and there where the bone is broken, there may be notice taken of a Cavity. And there is also difficulty of breathing, the Cough, and spitting of Blood, that for the most part follow thereupon.

Prognosticks.

1. The Fracture of the *Stern* is very dangerous; in regard that by reason of the *Pleura* Membrane, (which is easily hurt together with the *Stern*) and the noble parts that lie under it, it is wont to attract sad and grievous Evils.

2. But yet it is consolidated in twenty, or twenty four daies, in regard that it is spungy and thin

The Cure.

Now that this bone when it is broken and depressed may be restored again unto its own seat, the sick person being laid flat upon his Back, a Pillow is to be put under the *Spina* or Back bone, over against the Fracture; and by some Servant of the Chirurgeon the Shoulder is on both sides to be pressed down; but let the Chirurgeon himself with his Hand press together the Ribbs on both sides, and so let him bring back the broken bones into their places. And after this, those Medicaments that are wont to be administred in other Fractures (and which prevent inflammation, and serve for the Conglutination of the Fracture) are to be imposed; and the binding is to be instituted with fit Swathes above the Shoulders, in the Cross Figure of the letter X; and this binding must not be over hard, left it hinder the breathing.

CHAP.

Chap. 17. Of the Fracture of the Ribbs.

And sometimes also the Ribbs are broken from violent causes, as a fall, a blow, or the like.

But now the Ribbs are sometimes so cleft (as *Celsus* writeth in his 8 *B.* and *Chapt.* 9.) that indeed not the top of the bone, but the inward part thereof, (which is thin) may be hurt; and sometimes so that this fal hath wholly broken them. And indeed the broken bones do sometimes decline inwardly; and sometimes they stick forth outwardly: and sometimes notwithstanding that they are wholly broken, yet they are not moved out of their proper places; and sometimes likewise the flesh about the Ribbs is battered and bruised.

Signs Diagnostick.

If the Whole Ribb be not broken, then neither is there any blood spit forth, neither any fever following thereupon, nor any thing suppurated, (or but very rarely) neither is there present any great pain: and yet nevertheless this place is lightly pained even upon the very touch.

But if the Ribb be wholly broken, and yet the broken extremityes thereof not moved out of their places, by being either driven inwardly, or forced into the Exterior part, there are but very few that are hereupon taken with a fever. And many there are also that do not at all spit blood; neither is there any *Pus* contracted in the Chests of some, and those indeed not a few.

But if the Ribb be both wholly broken, and the extremities thereof moved out of their places, there is then a certain inequality or unevenness, and Cavity, that may be both discovered by the sight, as also by the touch; and there is likewise a certain ratling noyse heard: unto which also there are divers other symptoms Joyned. There is present a very great and grievous pain, and especially if the internal part of the Ribb be broken; (and this pain much resembleth the pain of such as have the Pleurisy) the breathing is very difficult, the Cough extremely troublesom; and now and then likewise spitting of blood followeth thereupon (the Lungs soaking in the blood flowing forth of the broken vessells) and a feaver is also herewithall Joyned, and accompanyeth the same. But more especially two evills there are that usually attend the Fracture of the Ribbs. The first whereof is, the puffing up of the flesh lying upon the Ribb; which is discovered both by the touch and sight; and if the place be pressed together with the hand, there is heard a certain noyse and sound of the Air going forth thereof. Unto which unless timely Remedies be administred, (in the second place) an Inflammation, and a fever, and an Impostume are wont to succeed. The cause of which thing is the separation of the flesh from the bone, and a weakness brought upon the part with the blow, which cannot therefore sufficiently concoct the Aliment, that by reason of the pain is more abundantly attracted, and flowerh thereunto: which remayneth thereupon partly crude and is partly resolved into vapours and flatulencies or windiness. And somtimes the Corruption of the Ribbs is wont likewise to follow this Malady. For when the flesh is separated from the bone, the Air getteth in in the place thereof; by the contact and impression whereof the bone is offended and corrupted.

Prognosticks.

1. If the Fracture be single, without any Contusion or bruising of the parts lying neer thereunto, there is then little or no danger at all: and the Ribbs will grow together again within twenty days.

2. But if the flesh about the Ribbs be battered and bruised, then the evil is very dangerous (by reason of those symptoms that as we have before told you do happen herupon) & somtimes deadly. Touching which *Hippocrates*; (in his 3. *B. of the Joynts, Text.* 65.) *if the Contusion* (*sayth he*) *or the bruising that is caused about the Ribbs be neglected, although upon this a worse Mischief doth not follow, yet notwithstanding it hath the flesh more soft and spungy in the bruised place then it was before: and where such flesh is so left, and not by curing thereof restored unto a good habit, the thing is so much the worse, if filth and snottiness be left about the bone it self; in regard that the flesh wil now no more fasten unto the bone in like manner as formerly; and in regard that the bone it self is rendered more apt and ready for diseases: and for this very cause many have their bones vitiated, because that the evil is a long while protracted, ere it can be Cured.*

3. And thirdly likewise, the Fracture is ful of danger if the Ribb be driven inward and there prick or wound the *Pleura* Membrane; and then almost al those symptoms that are wont to infest those that have a pleurisy do follow upon the sayd fracture; and the Cure is scarcely ever perfectly accomplished in less then fourty days.

The

The Cure.

If the whole Ribb be not broken, (or if wholly broken, yet not removed out of its proper place,) and that there be no Contusion of the parts incumbent and lying neer, then some gentle Medicament that is fit and Convenient for a fracture and inflammations, is to be layd on, of *Frankincense, fine flour Bole Armenick, the White of an Egge,* and the like.

But if the broken Ribb stick forth outwardly it is to be pressed together with the hand, and to be reduced unto its Natural situation: and here also a Convenient Medicament is to be imposed.

But if the broken Ribb tend inwardly, we must endeavor that it may be brought back into its own place. And therefore we must first of all see whether by the Cough, and the holding of the breath, or by the help of the hands the broken Ribb may be restored again into its own place: which if it succeed not, then we must lay on some Emplaster that will attract, and that will stick fast unto the Ribb; and then this Emplaster is again with violence to be taken away, that so the Ribb may be brought back again into its own place.

And very Convenient for this use is this Emplaster also.

Take *The finest wheat flour two ounces; Tragacanth, & Frankincense powdered, of each five drams; Mißleto of the Oake, (to wit, the Glew) six drams; Ichthyocolla or Fish Glue one ounce and half; Whites of Eggs two ounces; Rose-water as much as will suffice; and mingle them.*

Or an Emplaster made of *Turpentine, Rosin, black pitch, Barly Meal, or Beanmeal, Mastick, and Aloes.* And such like emplasters as these are often to be applyed, and then to be taken off when the sick person shall breathe more freely. And I my self remember likewise that some yeers since a certain Cooper having a Ribb broken and depressed in his right side by the violent recoyling of a hoop, which he was bending to make a hoop for a Hogshead, or tub, (so that he could very hardly draw his breath) Coughed extremly, and was not able to lift himself up straight. I applyed and layd on such an Emplaster as this that we have mentioned, and thereby brought back the Ribb again into its proper place.

Some there are indeed who endeavor the bringing back of the broken Ribbs into their places again by the applying of Cupping-glasses: but Most Physitians dislike this practise, there being great cause to fear lest that by this means there be more of the humor attracted: and that otherwise the flesh above the Ribbs is wont to be puffed up. But if any broken fragment of the Ribb prick the Membrane, so that thereupon most grievous pains and other ill symptoms arise, (in so much that there be great cause to fear death) that part wherein the Ribb is broken is to be opened with the incision knife, that so we may the better come at the fragments that prick, either to pluck them forth, or to cut them off. And if likewise there be present any contusion or bruise, a vein is then to be opened, lest that an Inflammation follow.

The Ribbs being reduced unto their own places again, Nature will then indeed of her own accord generate the *Callus*; which that we may the better assist, some Emplaster that is convenient for a fracture of the bones is to be imposed; among the which this that followeth is one of the chiefest.

Take *Pouder of Myrtles, and red Roses, of each one ounce; the Meal of Barly, of the bitter vetch orobus; and of Lentiles, of Beans, and of Mastick, of each two drams; Acron Cups, Cypress Nuts, (the rinds of them) Frankincense, Dragons blood, Earth of Lemnos, Aloes and Myrrh, of each two drams; Oyl of Myrtle, of Roses, and oyl omphacine, of each nine ounces; Wax and cleer Turpentine, of each half a pound; and make an Emplaster.*

Some there are that (in the progress of the disease) wet and soak the swathes in Rosemary water; which (as they write) is a very special and effectual water in all fractures of the bones.

But if the flesh be moyst and flaggy, then the Medicaments before propounded are to be imposed; and the place is to be streyned together with swathes and other Coverings, that so the flesh may again be conjoyned with the bone. And if through Negligence of the Physitian, or the sick person himself, the Malady be now become old and inveterate, and that the flesh be rendered soft and snotty (so that there be cause to fear lest that the bones, Gristles, and Membranes may be hurt) we are then to do our endeavour that the said snotty Juice may be discussed by such digesting Cataplasms as we shall anon speak of. But if this may not be done, the burning iron is the best Remedy; and yet here we are to be very cautious, that the bone be not made hot, or the inward parts hurt.

If that which was bruised tend toward a Suppuration, the Matter is then to be resolved, and evacuated with a Cataplasm of *Barly meale, Bean meal, or of the bitter vetch Orobus, Camomile flowers,* and the like. As,

Take *Meal of Beans and Barly, of each*

two

two ounces; Wormwood, half an ounce; the pouder of Camomile flowers, Melilote, and Eldern, of each one ounce; boyl them in Spring Water; and then add Oyl of Camomile and Roses, of each one ounce; and make a Cataplasm.

But if the matter cannot yet be discussed by these Medicaments, all delay is to be avoided, for fear lest that the bone be vitiated; and therefore in that part wherein it most swelleth the part is to be opened either with the Penknife, or with the hot Iron, that so a free passage forth may be opened for the *Pus*.

The Dyet

Let the Patients Dyet at the first be thin and very sparing, and such as is required in other acute Diseases. Let the sick person keep himself as quiet as he can, without any Coughing, or Sneezing (as much as may be) let him not talk much, nor laugh, nor Chafe. See *Hippocrates*, in his 3. *B. of the Joynts*, *Text* 54. &c *Galen* in his *Comment.* upon the place; and *Ambrose Parry*, in his 14. *B.* and 12. *Chapter.*

Chap. 18. *Of the Fracture of the* Spina Dorsi, *or* Back-bone.

AND sometimes it likewise so happeneth, that from external and violent Causes the *Spina Dorsi* (or Back-bone) and its *Vertebræ* are broken.

Signs Diagnostick

If the *Spina* or Back-bone be broken, then there appeareth a Cavity in that place, and there is a pain and pricking felt; in regard that of necessity those broken fragments of the bones must needs be very Thorny and Pricking, as *Celsus* tels us in his 8. *B.* and 9. *Chap.* And if any process of those broken bones that stick forth be broken, this is discerned by the touch, because that it may be moved this way and that way. And moreover, if the sick person lie upon his Face the pain is so much the greater, and far more then if he stand upright. For there the Skin is extended, and bruised with the sharp broken fragments: but if the sick person stand upright, the Skin is then loosened, and not so much pricked by the sharp points of the broken bones, that prick as if they were Thorns or Goads.

Prognosticks.

1. The process of the *Vertebræ* is easily of it self consolidated, unless some other evil happen to follow, in regard that the bones are Spungy and thin.

2. Otherwise this Fracture is for the most part Mortal, by reason of the hurting of the spinal Marrow, and the Membranes, and the Nerves; and especially if the Fracture happen neer about the *Vertebræ* of the Neck.

3. And if there happen a Fracture in the *Vertebræ* of the Neck, there followeth a Palsey of the Arms and Hands; but if the Fracture chance in the inferior part, then there followeth a Palsey of the Thighs, Legs, and Feet; and this is deadly: but if the motion and sense be not altogether abolished, there is yet some smal Hopes left of recovery.

4. If in the Fracture of the *Vertebræ* there shall appear any voluntary Egestion of the Excrements, and that there happen a suppression of the Urine, it is a very desperate and deadly Sign.

The Cure.

Although there be here but little ground for Hope; yet nevertheless that the sick person may not be wholly left in a helpless condition, the broken *Apophyses* of the Back-bone are again to be put back into their own places (if they be not altogether broken off) and Medicaments are to be impoſed that may moderate the pain, prevent an Inflammation, and further the Conglutination of the bones; and such medicaments as these have already been very frequently mentioned. But if the process be wholly broken off from the Periostium, the Skin is then by an incision to be opened, and the piece of bone to be drawn forth, and the Wound afterward in a due and convenient manner to be healed. And this is likewise to be done, if the fragments or broken pieces of the other *Vertebræ* press together and prick the spinal Marrow and the Nerves thereof; for otherwise the life may be much endangered.

The Fracture of the holy bone, and the Crupper.

Unto the Fractures of the *Spina* there belongeth also the Fracture of the *Os Sacrum*, and the Crupper-bone; which if they shal be so broken and bruised that thereupon the Spinal Marrow be hurt, the Malady then is very dangerous, if not altogether deadly. But if there be any the least hope left, the Finger being put up into the Arse even unto the broken place the bone that is broken is to be driven forth; but outwardly by the other Hand, (or else by the help of some assistant) the bones are to be made equal and even, and so to be put back into their own places again; and afterwards Medicaments convenient for the Fracture are to be applied and laid on.

CHAP.

Chap. 19. *Of the Fracture of the Bones of the Hand.*

THe Bones of the Hand (which are divided into the bones of the Wriſt, upper part of the Hand, and the Fingers, are likewiſe ſomtimes broken.

Signs Diagnoſtick.

The Fracture in theſe bones is eaſily known both by the ſight and touch; in regard that theſe bones when they are broken do for the moſt part decline either unto the exteriour or the interior parts.

Prognoſtick.

Theſe Bones without any great ado, (and indeed within twenty daies) do perfectly grow together again, and ſo are healed.

The Cure.

Let the ſick perſon ſtretch forth the Hand that is hurt upon an even and ſmooth Table: and then let the Chirurgeons aſſiſtant ſtretch forth the broken bones, but let the Chirurgeon himſelf reſtore (with his Hand) the bones into their places again. When the bones are well ſet together, then ſome Medicament (ſuch as is wont to be adminiſtred in Fractures) is to be impoſed: and then afterward the part is to be wrapt about with a Swathe. And indeed if the Fingers chance to be broken, they are to be tied faſt unto thoſe ſound Fingers that are next; that ſo by them (as it were by Splinters faſtened on) they may be kept unmoved in their places. And then at length the hollow of the Hand is to be filled up with a bottom or ball of Linen rowled up together. For ſo by this means the bones when they are ſet are the more eaſily kept in their places, and the Fingers preſerved in a middle Figure. But if either in the extending or contracting the Fingers there be any *Callus* generated, the Office of the Hand in laying hold on any thing is much hurt. And let the Hand alſo (with the Arm hung in a fit Scarf or Swathe from the Neck) be kept in reſt and quietneſs.

Chap. 20. *Of the Fracture of the Hip-bone.*

THe Hip bone conſiſteth of three bones; of which the Firſt is the *Ilium*; the Second, the *Iſchion* bone; and the Third, the ſhare bone; which in Infants may even be ſeparated; but yet nevertheleſs in perſons of ripe Age they grow ſo faſt together that they can very hardly be parted aſſunder. But now theſe bones may be broken (like as thoſe of the Shoulder-blade) either in their Extremityes, or long waies, or in the middle.

Signs Diagnoſtick

This Fracture is eaſily known by the pain, which is more eſpecially exaſperated by the touch and compreſſion; by the Cavity and unevenneſs; and alſo by the pricking and benummedneſs in the Leg of the ſame ſide.

Prognoſtick.

Theſe Bones are conſolidated in the ſpace of twenty four daies.

The Cure

The broken bones are with all poſſible ſpeed and diligence to be ſet together, and to be reſtored into their own places; and then afterward fit and proper Medicaments are to be laid on. But if any fragment of the bone be broken off, and by pricking excite pain, and that there be any fear of an Inflammation, there are ſome who perſwade us that even at the very firſt dreſſing an inciſion is to be made in the Skin, and the broken piece of bone forthwith taken out. But whereas it is very ſeldom that theſe fragments lie hid under the Skin alone, but even under the very Muſcles themſelves; ſuch alike Section as they adviſe us unto may not be inſtituted without much danger. And he that will needs attempt it, let him be very cautious leſt that he hurt the Heads of the Muſcles, or ſome one of the principal Veſſels; or that greater Nerve which is ſtretched forth into the Muſcles of the Thigh and Leg.

Chap. 21. *Of the Fracture of the Whirl-Bone in the Knee.*

AND ſomtimes likewiſe even the Whirl-bone it ſelf is broken; and this happeneth ſomtimes in the length of it (in reſpect of the whole Thigh) ſomtimes in a tranſverſe, and ſomtimes in an oblique manner; and ſomtimes it is broken into two parts, and ſomtimes into very many pieces; and ſomtimes again this Fracture is with a Wound, and very often without.

Signs Diagnoſtick

The Fracture of this bone is eaſily diſcovered by the diſtance of the broken bones, appearing by the touch; by the Patients weakneſs and inability in going; by the Cavity that is perceived (in the place where the Fracture is) both by the ſight and by the touch; and by the Craſhing Noiſe and ſound that is obſerved in the handling thereof; and in its motion.

Prognostick

1. The Whirle-bone indeed (as all other thin bones) easily groweth together again, if it be but rightly Joyned together, and so preserved.

2 And if the fracture be made in the length thereof, the bones may very easily be joyned together; and being so Joyned they may without any great difficulty be so kept in their own places by the use of pillows and Swathes. For whereas about the whirl-bone the extremityes of the Seventh, Eighth, and Ninth' Muscles, that move the ankle and leg, run along together, and end in that most strong Tendon that is implanted in the Whirl-bone; and that the Muscles are wont of their own accord to be moved and drawn toward the place of their originall; therefore even without any great industry and paines, the fracture that is made long wayes may be reduced into its own place again & the bones most closely conjoyned as before; and so no great cause to fear the bunching forth of any *callus*, & a lameness following upon this fracture. *Paræus* indeed (in his 14 Book. and 22 Chapt.) writeth that he never saw any, who having this bone broken was not lame, so that he halted al his life after it: and this even therefore, because that the Concretion of the *Callus* being produced, the Consolidation doth hinder the free bending of the knee. But although this may easily be granted as touching the transverse fracture; yet notwithstanding *Guilhelmus Fabricius* (in his fifth Cent. and 88 Observat.) hath rightly determined, that this is not alwayes necessary (especially in the fracture that is made in the length of the bone) in regard that there is no necessity that there should evermore be bred a *Callus* so sticking forth, that it should cause an impediment of the motion in the knee, and so consequently a lameness and halting: and we may see that in the fractures of other bones Nature doth usually so generate the *Callus*, and with that Neatness and skil, that oftentimes there scarcely remaineth any the least sign or token of any fracture appearing; and this especially happeneth when the *Periostium* is whole & unbroken, which reteineth the matter of the *Callus*, that it may not grow forth overmuch, nor bunch out too far.

3 But if the fracture be made either transversly or obliquely, all the industry that we can use will hardly so cure it as that no lameness nor halting shall follow thereupon. For seeing that the Seventh Eighth & Ninth Muscles moving the Ankle draw it upward toward the hip, but the Tendon that under the knee is inserted into the shinbone draws the whirlbone downward, the bones of the broken whirlbone are so di joyned that they can hardly by any art be joyned together again, or being joyned can be so kept together; whereupon the *Callus* buncheth forth, & the Muscles moving the Leg and Ankle are hurt, and so a Lameness and halting followeth.

The Cure.

The Leg is first of al to be extended: And then after that by the Chirurgeon the Whirlbone (whether it be broken into two or more parts) is to be Joyned together again; and an Emplaster or Cataplasm be fitting the Fracture (that may keep together the bones when they are set) is to be layd on; and the Member is conveniently to be bound up; and by imposing of rowls of Straw (as is wont to be done in the Fracture of the Leg, the Member is to be kept immoveable, and great Care must be taken that the Leg be not at al bended: for if this should be, the broken Fragments that were set together would be again removed out of their places.

If some sharp fragment of the bones be separated from the rest of the bone, and prick the Skin, some there are (as I told you before touching other Fractures) who advise us to cut into the Skin, and so take forth the bone.

If grievous Symptoms shall happen to follow, we must timely oppose them with such Remedies as in other Fractures.

Chap. 22. *Of the* Fracture *of the* Bones *of the* Foot.

And Lastly, The bones of the Foot are likewise somtimes broken; of which how many bones there are. As for that we refer you unto the Anatomists. But *Hippocrates* (in his 2 Book of the Joynts) writeth that the bones of the Foot, as likewise of the Hand, are not at al broken, unless the fleshy parts be wounded by something that is very sharp or heavy. For these bones being harder then ordinary, these things that are sharp and very heavy, if they break these Bones, they leave not the Skin lying upon them whole and sound, but much bruised. And *Paulus Æginet.* (in his 6. *B. Chap.* 106.) writeth, that the Ankle can by no means be broken; not only by reason of its hardness, but in regard that it is fenced and guarded round about.

Signs Diagnostick

If the bones of the Foot be broken, it is easily found by the sight and touch, in regard that these parts are void of flesh: and therefore if they shall stick forth upon their breach, this is easily discovered by the sight, and touch.

Prognosticks

Prognosticks.

1. The Fracture of these Bones is not of it self very dangerous; yet because they are greatly broken by reason of the forcible and violent Cause, the parts incumbent and that lie neer (being Fleshy and Nervous) are withall bruised and wounded; whereupon most grievous pains, Inflammations, and other Evils do arise.

2. And yet notwithstanding for the most part they grow together again in twenty daies, unless such as are nigh unto the Leg: for these being greater require the longer time for Consolidation.

The Cure

The Cure is almost one and the same with that of the broken bones of the Hand. To wit, there ought (in the first place) to be a fit extension; and the Bones (whether they stick forth unto the Superiour or the Inferior part) are to be forced back into their Natural seats; which may most fitly be done, if the sick person stand with the broken Foot upon a plain table covered over with a woollen cloth. And then Secondly, fitting Medicaments (such as the Fractures require) are to be administred. And Thirdly, The Foot is to be wrapt about with Swathes. And since that Splinters cannot conveniently be imposed upon the Foot, by reason of the unevenness of the place the *Splenia* Coverings are to be made use of, and the place to be bound with Swathes, that so the bones being set in their places may be there kept. And yet nevertheless the Situation and placing ought to be ordered otherwise then in the Hands: For our Hands being given us to lay hold upon, the Fingers (as we told you before in the 19. *Chapt.*) are to be placed in a Crooked Figure; but our feet being given us to stand upon, and to walk withal, are to be Situated in a straight Figure, and not crooked, lest that their Action be depraved and hindered.

And thus much we thought good also briefly to speak touching Fractures. For in regard we have extant the most learned Books of *Hippocrat.* upon this very subject, touching Fractures and the Joynts, and the most accurate *Comment* of *Galen* upon them, I held it altogether needless and not worth while to treat more largely of them, as I see that others have done before me: but think it fitter for me to refer the Reader unto them, if he desire to see more hereof.

THE

THE FIFTH BOOK, THE SIXTH PART.

Of Luxations.

Chap. 1. *Of Luxations in general.*

THere are very many Bones in the Body of Man which are compoſed and joyned together after divers ſorts. But they are chiefly compoſed by a *Symphyſis* and Articulation. A *Symphyſis* is a union of the Bones without motion: but the Conjunction by Articulation is compoſed for motion; the differences of it are chiefly two, a *Diarthroſis*, and *Synarthroſis*. *Diarthroſis* is with a manifeſt motion; *Synarthroſis* with an obſcure one, of which conſult with the Books of Anatomiſts.

What Luxation is. When therefore the Bones which are joyned by Articulation do fal out of their place, the Diſeaſe is called by the Greeks *Exarthrema*, by the Latines a Luxation, which is the falling down of the Joynt out of its place (which is called the *Acetabulum* or hollow) into another place; by which voluntary motion is hindered: *What a Joynt is.* where by a Joynt is underſtood, as *Galen* and *Hippocrates* alſo do teach Artic. 1. Text. 1. not that aggregate of the two ends of the Bones joyned together, but only the head of the joynt.

The Cauſes.

Internal Cauſes But the Cauſes of a Luxation are either Internal, or External. The Internal are humors which falling down upon the joynts either do relax the Ligaments that they ſuffer the Bones to fal out of their ſeats, or by filling them up do ſhorten and contract them, that they draw the heads of the bones out of their ſears. To which hæreditary defects muſt be referred, whenas Experience doth teach us, That oftentimes thoſe that have bunches in their backs do generate the like, and lame folks beget lame. *External* But the external violent Cauſes are, blows, fals, violent extenſion, and the like, which can expel or draw forth the Bones from their ſeat; and that ſometimes is done even in the Birth, and the Arms or Thighs may be luxated while the Infants are drawn forth with violence by ignorant Midwives; nay in the Mothers Womb Infants may have a luxation of their bones by a blow, fall, compreſſion, as *Hippocrates* ſeems to intimate 3. *de* Art. 88. and 94. and 4. *de* Artic. Text. 2. and 3. but al cauſes of what kind ſoever do cauſe luxations either by violent diſtenſion or impulſion; moſt commonly a luxation is cauſed by violent impulſion, when from cauſes happening from without, as fals, jumping, blows, and the like, the bones are violently expelled out of their ſeats. Al other cauſes are to be referred to diſtenſion, to wit, when the Cavities receiving the heads of the bones (which the Greeks cal *Cotylæ*) are rendered either narrower, or larger and relaxt, this Cavity is made narrower, when a humor or ſome matter doth poſſeſs the boſom of the joynt and drives the bone out of its ſeat, which happens ſomtimes in pains of the joynts: but the Articulation is made larger or looſer when the brows including the boſom are broken, for ſo the bones may more freely wander and fal forth; and the Articulation is made looſer alſo, when ſome humor doth too much mollefie and relax the Ligaments, and renders the whol Articulation more looſe. The ſame happens when the Ligaments are too much diſtended or broken.

But the Bones are more and eaſier luxated in Children and young folks whoſe Ligaments are ſofter and weaker than in thoſe of riper age, whoſe Ligaments are firmer and ſtronger. It happens alſo in them whoſe bodies are waſted and have weaker Ligaments; but thoſe who are fleſhy and wel habited have not their joynts eaſily fal forth, whenas the joynt is on every ſide ſtraightly girt in with ſtrong Muſcles; alſo thoſe joynts are eaſier luxated which are compoſed for many ſorts of motions; but thoſe which have fewer different motions do not ſo eaſily fal forth of their ſeats; thoſe joynts alſo which are contained with one Ligament are more eaſily luxated than thoſe with two; the greater bones alſo are more difficultly luxated, and not unleſs by a violent cauſe; the leſſer bones more eaſily: laſt of al, ſome bones do more eaſily, ſome more hardly fal out of their places, according to the nature of the Articulation, as afterward ſhal appear in particular. This muſt be obſerved in general, That the joynts which are in a plainer boſom are more eaſily luxated; but thoſe which are hid in a deeper boſom more difficultly.

The Differences.

The proper Differences are taken either from the Subject, or the Form, or the Efficient Cauſe. From the Subject, becauſe the bones which are luxated are joyned either by a *Synarthroſis* and with an obſcure motion (as when the broad bone of the ſhoulders departs from the ſhoulder bone;) *The Differences from the Subject*

or the Channel Bone from the top of the broad bone of the shoulders, or the radius from the Elbow; which kind of Luxation the Arabian Interpreters cal a disjunction, when the bones gape as it were; or by a *Diarthrosis* with manifest motion, which Luxation is most properly so called. There is also a peculiar kind of Luxation, but improperly so called, when the Epiphyses of the bones are pulled from the bone on which they were placed, which happens chiefly to young folks.

From the Form

From the Form because the Joynt sometimes wholly fals out of its seat: which Luxation is called by the general name *Exarthrema*, or Luxation; but sometimes it fals forth only in part, and to the brink of the bosom or hollow, which the Greeks cal *Pararthrema*, the Latines a Subluxation; to which kind of Luxation also belongs that elongation, when the Ligaments being luxated and made longer, the joynt indeed according to the longitude doth sometimes depart from its seat, yet fals not wholly out of it.

From the variety of the scituation

But from the variety of the Scituation to which the joynt fals forth there are fetcht three differences chiefly: The first is, if the bone which is naturally placed in the upper part fal out to the lower; or on the contrary The second is, if that become on the right side which ought to be placed on the left; or on the contrary it fal from the left to the right, which others cal outwardly or inwardly. The third is, if that which was placed in the fore part fal to the hinder, and on the contrary that which was placed behind fal out to the fore part; and the joynts of some parts may be luxated into al these differences, some only into certain differences, not al; so the elbow, hand, thigh fal forth into four differences, viz. To the inward, outward, forward, backward, but cannot upward; the knee fals out into three scituations, viz. The inward, outward, and hinder part towards the ham; but the opposition of the patel bone hinders its falling out to the fore part, of which shal be spoke hereafter in the Luxations of the particular parts.

From the Efficient Cause

The Difference is taken from the Efficient Cause, because the Luxation is sometimes from external Causes, as fals, blows, jumpings, running, and from a violent distorsion, extension, and impulsion of the part, but sometimes from internal causes, as while a humor sliding into the cavity of the joynt drives it out of its place.

Improper Differences

There are also certain improper Differences, or rather complications of other preternatural Affects with Luxations, as that an Inflammation, fracture, wound, or somwhat else is joyned with the Luxation.

Signs Diagnostick.

A Joynt being fallen forth into another place is easily known by the sight and touch; for there appears a Tumor in the part into which the joynt is fallen, but a hollowness in the place from whence the joynt is fallen; and that appears so much the easier, if the body be not very thick and fat, or the place be void of flesh. Again, if the Luxation be perfect, that Member is made shorter, whenas the joynt no longer included in its Cavity, but falling out of it, is drawn upwards: yet sometimes the Member becomes longer, as is afterwards said in particular. When then the Member luxated is alwaies unlike to the sound one in scituation, figure, and longitude, we must alwaies compare the Member affected with the like sound part of the same name, Arm with Arm, Thigh with Thigh in the same man; where yet we must observe, that the Member with which we compare it be sound, and have no fault. Thirdly, because Articulations are made for motion, if a joynt fal out of its natural seat it must needs be that the motion of the joynt is hurt; therefore where there is a suspition of a Luxation, yet the motion is not hurt, we must conclude that there is yet no luxation made. Lastly, because a joynt falling forth of its seat doth compress the sensible parts into which it is fallen, as the Tendons, Nerves, Muscles, from thence there is raised a pain.

And these are the signs of a perfect Luxation; but if there be only a Subluxation, the Signs propounded wil either be more gentle, or some of them wil be wanting.

If there be a Luxation of a joynt joyned by a *Synarthrosis*, in which the Bones do gape, it is known by the thickness of the Member greater than usual, and by a greater bunching out than the heads of the bones do consist of.

The signs of the Causes

As concerning the Causes, the external and violent are apparent by the relation of the Patient, and the Luxation proceeding from thence happen suddenly; but if the Luxation be by reason of the looseness of the Ligaments, it happens by degrees; and the luxated Member is moved and totters up and down with inordinate motions; and whiles the joynt is forced into its seat, the Member indeed acquires its natural longitude, which being let alone again presently it becomes longer.

Also if the head of the Bone luxated be thrust with the fingers to the contrary part, it easily recoil back; every where about the joynt there is a Cavity begotten, that if the finger be thrust into the joynt it easily goes in, no body resisting, as if al were empty.

When some *Epiphysis* is pulled off from its being, it is known by the impotency of motion, and by the crackling, when they are handled and moved.

The

Prognosticks.

1. In the Bodies of Children and yong folks, and those that are softer the bones luxated are easily restored, yet being restored are not so faithfully retained; the contrary happens in riper and harder bodies.

2. The Joynts which are dedicated to fewer differences of motions are more difficultly replaced, but better contained.

3. By how much the further the joynt is fallen from its bosom, by so much the more difficultly 'tis restored; by how much the neerer, by so much the sooner.

4. The Luxations in which the brows of the bones are broken are worst of al; for though the joynts be restored to their places, yet they continue not long, but fal out again upon the sleightest cause.

5. The joynts which are fallen forth by reason of the Laxness of the Ligaments, though they be replaced, yet do easily fal forth again.

6. Those Luxations which have a great pain, inflammation, or wound happen on them, are hard to be cured, and want not their danger, and cannot be restored without danger of Convulsions, nay of death. Wherefore if the bone being reduced the Nerves be distended, it must presently be forced out again, as *Celsus* doth counsel.

7. Old Luxations and which are grown hard with a Callus, and which have a clammy humor filling up the Cavities of the Bones, are never or very hardly cured; therefore every Luxation must presently be replaced.

8. They who in their Childhood have had their joynts fal forth, and are not replaced, they grow less than others.

9. What Member also soever hath been troubled with a long continued Luxation, by how much 'tis the less able to be moved by a natural motion, by so much the more 'tis extenuated and wasted, both because by intermission of motion the Native heat of the part is dulled, and because the Vessels are compresst by the luxated joynt, and the necessary influence of blood and spirits is hindered.

10. A Luxation of the head brings death, by reason of the compression of the Spinal Marrow presently at its first rise, and the prohibition of the influx of animal Spirits.

We shal afterwards speak in particular of the Prognosticks of the rest of the joynts.

The Cure.

The Bone luxated, and which is fallen out of its natural seat, shews a reposition to its natural place; and this Indication is satisfied, and Luxations are cured by straining and forcing them to the part opposite to that from whence the change is made; which replacing of the joynts fallen forth of their seats is called *ton arthron embole*, and *arthrembole*. But the replacing of luxated Bones is compleated three waies, either by the hands of the Chirurgeon and his Servants, which is the most simple, and is called Palestrical, because 'twas used in the wrestling places if at any time the Fencers Limbs were luxated; and 'tis convenient in soft bodies, and where the evil is fresh; or by some vulgar instruments the joynts are forced into their seats, as by the help of reins, swathes, ropes, ladders, seats, two leav'd doors, which is called the Methodical way, and is convenient for children, women, and the stronger males, and for old luxations; or 'tis performed by instruments and certain singular engines, and 'tis called organical, and 'tis applied to stronger bodies and old Luxations, and altogether to those which cannot be restored the two former waies. But concerning such Engines see *Hippocrates de artic. & fractur.* and *Oribasius de machin*: Others hold only two waies, the Palæstrical, and Physical; and under Physical comprehend the Methodical and Organical.

How many Operations are required to the reducing of luxated parts.

But what way soever the restitution of the luxated bone is performed, four operations are necessary to it, Extension, Replacing, Rowling, and Confirming & placing of the Member reduced: for first of al, whenas the Muscles are contracted, as we have said of Fractures, there is need of extending the luxated member, which must be done presently after the Luxation is made; or if the Chirurgeon be called late, when the fear of Inflammation is over; and so far it must be made, that some free space may be left between the bones, lest the joynt or head of the bone be rased, or the brows of the bosome be broken; and in the Extension a convenient figure of the part must be observed, and the Muscles on one part must be kept whole, and not be distorted, to wit, lest the Head of the Muscle be in the internal part, and the end of it in the external. But Extension is made either by the hands of the Chirurgeon, or his servants; or with Reins, Ropes, and Swathes, or with Instruments and Engines, as was said before.

Extension:

Replacing

Sufficient extension being made, the bone which is fallen out of its place must be replaced in it, which labor the Greeks cal *Mochlia*, and *Mochleusis*, viz. the compulsion of the bone luxated and extended into its seat: but that this operation may be done rightly, both the nature of Articulations, and how al the bones in the body are joyned together, and the differences of Luxations ought to be known; for the Chirurgeon wil not know certainly into what place he ought to force the luxated bone, if he do not rightly know before, out of what natural place it is fallen; for the Chirurgeon ought to consider from whence the Joynt hath first fallen, what pro-

gress it hath made in its fal, and whither 'tis come at last; and from the end of its fal, the same way by which it fel forth, to force it back again to the Joynt from whence it fel: as if a Joynt be fallen forth from the left towards the right, he ought to force it towards the left; if it be fallen from the right towards the left, then towards the right; that which is fallen towards the forepart must be forced to the hinder part; that slipt forth to the hinder part towards the fore part. And there are so many waies of this reduction, as there are Joynts; for example sake, the Shoulder is one way, the Foot another, and the *Vertebræ* another way reduced into their place; and the Shoulder otherwise when 'tis fallen into the Arm-pit hole, otherwise when to the fore part. But the bone must be forced into its place gently, and if need be applying first of al laxative & mollefying Medicines, lest there be a contusion or grating of the head and bosom upon one another, or a pain or Inflammation be caused; and we must avoid wheeling about the head of the bone, lest it break.

But we shal know that the Joynt is rightly reduced, if the member and juncture recover its natural figure, longitude, and lost motion, and it wholly agree with the like named sound member, and the pain which was present before do cease. There is wont also for the most part to be heard a certain crackling and sound when the bone returns into its Cavity, but we must not trust to this sign alone, for sometimes there is a crackling made, and a noise heard by reason of the breaking off of the brows of the bone, which may be, when the head of the bone is so struck against the brows, that somwhat of them is broke off; and then whenas that part of the brow broken off doth sooner get into the bosom then the Joynt, the replacing cannot be right. A crackling and noise also may be caused, when in a violent reducing the joynt or head of the bone hits against the bosom, and contuseth it, whence the Cartilage is separated from the rest of the bone, and there is a difficulty of motion; therfore all the other signs must be joyned together.

Binding: The Joynt being reduced into its seat, the distention must be bated, and we must suffer the Muscles to return to themselves, and afterwards the member must be so strengthened that the Joynt cannot again go out of its place; which is done almost after the same manner as in Fractures; for first of al before binding up be ordered, astringent medicines must be laid on, which hinder a flux of humors and Inflammation, and contract the Ligaments relaxt, and strengthen the part; of Bole, *Sanguis Draconis*, Pomegranate Pils, Pomegranate flowers, Roses, Frankincense, fine Flour, and the like, mixt with the white of an Egg; if the pain be great those things also which together with an astringent faculty do mitigate pain, as Oyl of Roses, Mastick, and the like. Or,

Take *of the greater Comfrey, Bean flour, Bole armenick, of each three ounces; steep them in Vinegar and dry them: afterwards*

Take *of Litharge, Wax, Rosin, of each three ounces; melt them over the fire and add the things forementioned steeped in Vinegar; and last of al two ounces of Tragacanth. Make a Plaister.* Or,

Take *of new Wax three ounces, Mistleto of the Oak, Mastick, Rosin of Pine, of each half an ounce; mix them.*

Then the Member must be conveniently bound up, with Rowlers and Bolsters, as we said concerning Fractures. And *Gabriel Fallopius* teacheth at large, *Tract. de Luxat. c.* 5. that the bone may be kept in its place, and the flux of humors hindred. If need be, and the figure and nature of the part wil suffer it, Splints must be laid on of Pastboard, or Leather, or some other convenient matter.

Placing of it: Last of al, the member must be placed gently, evenly, and that the position keep a middle and natural figure, lest pain be caused, and it must be kept unmoved til the fourth or seventh day, unless an itching, pain, or other Symptom do urge; and afterward it must be strengthened with conveniens Medicines.

Chap. 2. *Of a Luxation with Pain, Inflammation, Wound, Fractures.*

BUt it happens sometimes that the Luxation is not alone, but other preternatural Affects, Pain, Inflammation, Wound, and Fractures are joyned with it. But if before the Physitian be called Pain and Inflammation hath already seized on the part affected, we must not try to restore the luxated Joynt, til the Pain and Inflammation are allaied; for if that be tried before this is done, it is to be feared, lest by the distension of the Nerves a Convulsion, or some other dangerous Evil arise; therefore before the replacing of the Joynt be attempted the pain must first be mitigated, and the Inflammation allaied, by those medicines which are formerly mentioned. If after the Joynt be replaced, and the binding be loosened, there be an Itching, the place must be sprinkled with warm Water, that the humor the cause of Itching may be discust, and the pain abated; otherwise if there be no Itching we must forbear warm sprinklings, lest the Ligaments be relaxt; or rather when the binding is loosened, the place must be fomented with some strengthening Decoction. As

Itching:

Take *of the Leaves of Myrtle, Oak, Wormwood, of each one handfull; red Rose flowers half a handful, Pomegranate rind one ounce, Pomegranate flowers, Misleto of the Oak, of each half a handful: Boyl them in harsh Wine.*

If

A Luxation with a wound:

If a Wound be joyned with the Luxation, that is very dangerous and oftentimes kils the man, whenas from distention of the Nerves and Muscles, a Pain, Inflammation, Convulsion, acute Fevers are caused; and the danger is by so much the greater, by how much the Member is greater, and the Nerves and Muscles about it are the greater; whence a Luxation of the Shoulder and Thigh with a Wound for the most part brings death: and the danger is the greater by how much the Wound is neerer the Joynt; and therefore *Hippocrates* is against the reducing of luxated bones and their bindings up, and commands to use at the beginning only things that assuage pain, and take away Inflammation, and thinks that none of these can safely be reduced, besides the Fingers, Hands, and Feet; & in these also he commands al things to be done very diligently; for neither a Finger (in wch there is least of danger) ought to be replaced when there is an Inflammation, but either before the Inflammation comes, or after tis allaied. But much more is this to be done in other Joynts, of al which *Hippocrates* (Artic. 4. Text. 16. and 17.) saith, *For in whomsoever the bones of the Leg luxated with a wound made, do wholly hang forth from the joynts of the foot, whether they tend inwardly or outwardly, they are not to be reduced, but let them suffer he that wil to replace them; for ye may know, that if they remain reduced they shal die, and their life shal be of very few daies, for there are few of them which pass the seventh day; for that which kills them is a Convulsion; moreover it happens also, that both the Leg and the Foot do gangræne. We must know for certain that these things wil so come to pass.* And there also Text 28, 29, 31. which places there you may see, and also *Galens* Comment. And therefore presently at the beginning, and before an Inflammation come in a Fracture with a wound, we must try whether the joynt may be restored into its seat with moderate extension (for it can by no means endure strong) which if it succeed to your mind we must labor chiefly in this to keep off an Inflammation; but if the joynt being replaced an Inflammation or Convulsion doth happen, the joynt must be thrust out of its place again (if it can be done without violence) or if we fear this danger, 'tis safer (especially in the greater joynts) to defer the reducing til the Inflammation is ceased, and the fear of it is past. When the Inflammation is now ceased, which is wont to be about the seventh or ninth day, both must be signified & foretold to the standers by; and the danger which is at hand by the reducing, and the weakness of the part, by which the man is rendered lame and maimed if the joynt be not restored: and if they urge the restitution of the joynt, it must be attempted without any violence; afterwards the Cure of the Wound must be ordered as in a fracture with a wound, but the member it self must be so placed that the Patient (as much as may be) may be free from pain. See *Hippocrates* of these things in the place before alleadged. Sometimes also it happens that a Fracture is joyned with a Luxation, therefore the Chirurgeon must be wary; and if the Fracture offer it self neer the Joynt, let him consider whether the Joynt be whole or luxated, lest while he cure the Fracture he neglect the Luxation. Thus I remember a Neighbors Child, a Boy about nine yeers of age, whenas a Vessel into which they were wont to pour their hot Drink after it was boyled, fel upon his Thigh, and his Thigh-bone was broke, and the Joynt of the same luxated, which when the Chirugeon observed not, and only Cured the Fracture and restored not the Hip-joynt, the Boy became lame. But if there be a luxation with a Fracture, the Member must be extended the common way, and the luxated Joynt must be reduced into its proper place, and the broken bones must be conformed and composed; and first of all indeed the luxated Joynt must be replaced if it may be done, then the Fracture must be Cured, and fit Medicines must be laid on them both, of which we have spoken already; and convenient binding up must be ordered; but if the Joynt cannot be restored to its place without danger before the Fracture be cured, then the Fracture must be cured first; afterward when the callus is generated, we must endeavor that the luxated Joynt also be restored.

The Cure of an old Luxation.

Last of al, if a Luxation by reason of an Inflammation coming upon it, or a Wound or Fracture joynd with it, cannot presently be restored, but there is a callous hardness contracted about the Joynt, the place must be fomented either with plain warm water, or with a mollefying Decoction made of Marsh-mallows, Mallows, Camomile flowers, Fenugreek seeds, and the like; but after the Fomentation the Joynt must be anoynted with Oyntment of *Dialthæa*, or some other mollefier, or this like Cataplasm must be laid upon it.

Take *of Marsh-mallow roots, wild Cowcumber, of each three ounces; Mallows, Marsh-mallow leaves, of each a handful: Boyl them til they are soft, and searce them through a hair Searce; add of the Flour of Fenugreek, Flax seed, of each half an ounce; Oyl of sweet Almonds, Hogs grease, as much as is sufficient; make a Cataplasm.*

If the hardness be greater, add to the things boyled, wild Cowcumber root, and lay on it *Diachylum magnum.*

When the Member shal be sufficiently mollefied if need be Digesters may be applied; as Betony, Sage, Hyssop, Groundpine, the Plaister of Betony, and the like. Or Suffumigations with a fire-stone or Mil-stone, or Bituminous and Sulphurous Baths, if they may be had; Lastly, when whatsoever was hard is mollefied and discussed, the

the joynt in convenient manner must be restored to its place, and the rest must be performed as was said above, Chap. 1.

Chap. 3. *Of a Luxation of the Mandible.*

AND let it suffice to have said this briefly of Luxations in general; now we must say somwhat in particular of the Luxations of the chief joynts.

And first of al as concerning the Luxation of the Mandible; whenas Nature hath made only the lower jaw movable in al creatures, the River Crocodile excepted, (which as *Aristotle* witnesseth, 1. Hist. Animal. c. 11. and 3. Hist. Animal. c. 7. moves its upper Jaw) it is easily apparent that that only can suffer a Luxation. The which notwithstanding is not easily luxated, by reason of the most straight coarticulation of it with the bones of the head, and the exceeding strength of the Muscles that draw it upwards; but into what part the Mandible may be luxated, its structure and insertion do plainly teach us: For as concerning its structure, it hath two processes in its hinder part on each side; the former of which drawn forward being broad and thin ends as it were in a point; but the latter is carried backwards and makes a long and transverse head; that is inserted into the *Os Jugale*, but this is fitted to the second bosom ingraven in the Temple bone.

The Differences.

From which it doth manifestly appear that the lower Mandible cannot be luxated to the hinder part, because the Teat-like processes of the Temple bone do hinder it; nor to the right (especially in those of ripe age) because the left head of the Jaw hinders; nor to the left, because the head of the Jaw in the right side hinders that. In those of ripe age I said, for 'tis wel known by Anatomy that the lower Mandible in Infants is cleft, and in the midst of the Chin is joyned with a great deal of Cartilage; which Cartilage if it be relaxt by a flux of humors, or the Chin be struck, that the bone be separated from the Cartilage, perhaps the Jaw may be luxated to the right or left side, the which yet seldom happens, and therefore is not considered. But in the riper aged because that Cartilage hath so degenerated into a bony nature, that it can by no means be separated, no not by boyling, nay not the least footstep almost remains of a line, or any seam, but it appears one continued bone, Physitians do rightly affirm that the luxation can be made only to the fore part. But this Luxation happens, if the former and sharp process, like to a Beak, which by the Greeks is called *Corone*, do slide forth below the *Os jugale*, that it becomes so much lower then it, that it can no more return upwards again into its place; for otherwise though this process be let lower then the *Os jugale*, yet there is not presently a Luxation made, but the mouth being shut it returns into its place again; but this Luxation is made either in one side only, when only its right or left part slips forth; or in both sides together, when the whol bone of the lower jaw on both sides is fallen out of its seat.

The Causes.

But the most common Cause of this Luxation, nay almost the only Cause, is the too much opening and gaping of the mouth, whether it be by yawning, or by taking some heavy burden in the Teeth, and lifting it on high, so that the forenamed process becomes lower than the *Os Jugale*, as was said, and withal be turned aside; for its return into its seat is not prohibited unless it be turned aside. Yet this very thing happens seldom and hardly, and the Jaw is seldom luxated, by reason of the strength of the Muscles by which 'tis tied to the upward parts. For from both processes of the lower jaw arise Nervous and most strong Tendons, with which the Muscles are inwrapped which are called *Crotaphitæ* and *Masseteres*.

Signs Diagnostick.

That the jaw is fallen out of its seat may be known in general, because the lower jaw hangs forth to the fore part, and the process of the bone like to a beak stands out by the jaw. For if the process resembling a beak fal out of the *Os Jugale* it must needs be that there also it hang forth, which in a man not very fat is easily known both by sight and touch. The mouth remains open, whence the speech is hindred, and the spittle flows forth involuntarily.

If the jaw be luxated on one part, that with the chin is inclined to the contrary part which is not luxated; the mouth is distorted, whence the Teeth cannot be joyned, neither do they answer to their equals, but the dog-teeth are under the Cutters. In the luxated part there is perceived only a certain bunching out, and the temporal Muscle appears stiff. But if the jaw be luxated on both sides, al of it with the chin hangs forth, and that straight out towards the fore part or to the Breast; the lower Teeth go further out than the upper, yet they answer one to another, the Cutters to Cutters, the Dog-teeth to Dog-teeth; neer the Cheeks on both sides there appears a certain eminency, which the acute beak-like process doth make; the temporal Muscles, whose Tendons this process doth receive, (yea is wholly compassed by them) appear stretcht, stiff, and hard.

Prognosticks

1. The Luxation of the Mandible is a dangerous evil; and a jaw luxated (as *Hippocrates* teacheth 2. *de Art.* and *Galen* in his Comment) must speedily be replaced; since that the temporal muscles and the Nerves inserted in them (and consequently the brain it self) are easily drawn into consent

conſent. For the temporal Muſcles have the greateſt conſent with the brain, and do receive nerves from the brain of the third conjugation, from whence do ariſe not only pains, inflammations, continual feavers, dul ſleeps, but alſo death it ſelf is often haſtened about the tenth day.

2. Thoſe whoſe Mandible is not reduced, are wont to void by ſtool filthy and thin Choler; and if they vomit, the vomit is pure.

3. Yet there is greater danger inſtant; and the replacing is harder if the jaws be luxated on both ſides, then if only on one ſide, whenas al the Muſcles with which the jaw is contained are then diſtended.

The Cure.

The Mandible luxated ſhews that it muſt be reduced into its ſeat again; which how it ought to be done, *Hippocrates* teacheth 2. *de Artic. t.* 15. and 16. in theſe words. *One ought to hold the head of him that is luxated, another the lower jaw, the man gaping as much as he can conveniently, and taking it about the chin with his fingers both within and without, firſt a little while to ſtir it up and down, and then with his hand to move it aſide, and to command the Patient that holding the luxated jaw be further it, and be very obedient to him moving it. Then endeavor muſt be uſed, that at once of a ſudden we ſtrike it off of its three figurations; for the lower jaw muſt at once be promoted from its diſtorſion to its natural poſition; and it muſt be driven backwards, and the Patient obeying theſe ought to ſhut his mouth, not to gape any longer; and this indeed is the reducing of it, which cannot be done by other figurations; but afterwards a little Phyſick wil ſuffice, a bolſter laid on with a Cerote, we apply a looſe binding up; yet we perform this office more ſafely if the man be bended backward, and his head ſupported with a leather Cuſhion wel ſtuffed put under it, that it may yield as little as may be.*

If the jaw be luxated on both parts

For we muſt ſee firſt whether the jaw be luxated to both ſides or one; if both parts of the jaw are fallen forth, let the Patient be placed on ſome low ſeat, and let his head be urged either to the wal, putting between ſome hard Cuſhion; or let it be held faſt by a ſervant placed at the back of the Patient, or the Patient lying on his back, as you may ſee by the figure in *Hippocrates* in the place alleadged, text 17. let it be held faſt by a ſervant ſtanding at his head, and kept unmovable.

Afterwards the Chirurgeon ought to put both his Thumbs wrapt up in linen on the grinders, but with the reſt of his fingers to lay hold on the jaw outwardly about the chin, and try to reduce it by a manner and motion contrary to that which is fallen forth; which he may do, if firſt of al he draw the jaw downwards; becauſe the temporal Muſcles have ſnatcht the acute proceſs upwards; ſecondly becauſe the jaw is fallen to the fore part he muſt force the ſame to the hinder part; thirdly becauſe it was drawn downwards he muſt drive it upwards; al which operations a skilful Chirurgeon may ſpeedily and in a moment perform.

If on one ſide

But if the jaw be fallen out of its ſeat only on one ſide, the way of reducing it is the ſame, this only muſt be peculiarly obſerved, that the Jaw being drawn downwards and forced backwards, afterwards alſo muſt be ſtirred to the oppoſite ſide, and at once thruſt upwards.

Reduction being made, a Cerote of Wax and Oyl of Roſes muſt be applied to the heads of the Jaw or Temples; and if there were ſtrong extenſion made, to hinder an Inflammation aſtringent Medicines muſt be laid on with the white of an Egg, or others, as in other Luxations.

At laſt convenient binding up muſt be made, which muſt begin from the Chin, and tend towards the crown of the Head, and it muſt not be looſed before the third day. Let the Patient forbear from much talk, opening of his mouth, and gaping, and chewing of hard meats, and let him be content with Liquids.

If an Inflammation or other grievous Symptom be at hand, that muſt be conveniently oppoſed, as hath been often ſaid; and if there be joyned a pain of the Eyes and Neck, we muſt let blood in the Arm, as *Celſus* adviſeth, *l.* 8. *c.* 11. and the Temples and Neck muſt be anointed with Oyl of Roſes and Worms.

Chap. 4 *Of a Luxation of the Channel Bone.*

THe Channel bone alſo is ſomtimes moved out of its ſeat, which *Galen* proves by his own example, in *l. Hippoc. de artic. com.* 1. *tex.* 62. where he reckons up at large, how when he was thirty five yeers old in the wraſtling place this joynt was ſo luxated that between the top of the ſhoulder-blade and the throat there was three fingers ſpace, and what was done about it.

But the Channel Bone is luxated either againſt the Breaſt bone, or againſt the top of the ſhoulder bone; yet both of them ſeldom happens, by reaſon of its firm conjunction with both bones.

Signs Diagnoſtick.

But a Luxation of this Bone is not eaſily known; and *Ambroſe Parry* writes, *l.* 15. *c.* 11. That he hath known many Chirurgeons, who being deceived have taken a Luxation of the Throat for a Luxation of the top of the Shoulder. But it is known, becauſe the top as it were of the ſhoulder doth ſwel, and in the place from whence the Channel Bone is departed there appears a manifeſt Cavity; there is alſo a pain, inflammation, and

and an impotency to move and lift up the Arm, and to other motions that are performed by the help of the Shoulder.

Prognosticks.

1. This bone is hardly reduced and returned into its natural seat, but for the most part hangs forth more or less from the upper part.

2. But unless it be restored the Patient wil fail in some motion of his Arm, and cannot move his Hand neither to his Head, nor Mouth.

The Cure.

This Bone according to the variety of the Luxation requires divers Restitutions. In general, the Arm must be extended, and the channel bone thrust back into its place, which is done, if he lie on his back with a hard Cushion put under his Shoulders, that the Shoulder and Breast may bunch forth outwardly, and by lifting up, pressing down, or drawing the Arm forward, and backward, as need requires, and pressing it with the palm of the hand, this bone may be forced into its seat; afterwards fit Medicines and many bolsters must be laid on, and the part must be bound streightly; which strict binding few men can endure; yet *Galen* writes that he suffered such strange binding, that he could perceive the motion of the Arteries under his Throat.

Chap. 5. *Of a Luxation of the Back bone and Ribs.*

OFtentimes also the *Vertebræ* of the Back bone are luxated, and especially those which are in the Back, whence is a bunch in the back; but whereas I have treated of this, *l.* 2. *par.* 2. *ch.* 11. I wil not do it over again, but send the Reader to that place; two things only I add, the first concerning a Fracture which is made on the outer parts; if it be new, and made by a violent cause, it must presently be replaced by the help of a Chirurgeon, of which business do treat *Hippocrates*, *l.* 4. *de art.* *Galen* in his Comment. *Paulus Ægineta*, *l.* 6. *c.* 177. *Oribasius de mach. c.* 35. *Celsus l.* 8. *c.* 14. *Parry*, *l.* 15. *c.* 15. and 16.

A Luxation of the Vertebræ *outwards:*

But because this Evil steals by degrees upon Infants, and 'tis oftentimes hereditary, for the most part it is incurable: yet if there remain any hope of recovery, the Cure is done by convenient Plaisters which bind and strengthen the part affected, on which an Iron Plate must be laid, which by degrees may force the *Vertebræ* into their place. But that Plate ought to be so long and broad, that it comprehend the whole bunch; and that it may press it the stronger, the inward part which is next the bunch ought to be filled with Cotten closely bumbasted, and covered over with Linen; but this Plate must be so fastened and sewed to a Stomacher made of Linen or Bumbast, that when it is put on it may comprehend the part affected. This Stomacher must be tied with Strings, in other parts moderately, but about the part affected very straight, that the Plate may compress the bunching *Vertebræ*: and if the Luxation be in the *Vertebræ* of the Loyns, this Stomacher ought to comprehend not only the Breast, but al the lower Belly also, to the Privities.

Such a Plaister may be made.

Take *of common Oyl, Hogs grease, of each three ounces; Deers suet one ounce and half; melt them and mix them over the fire, then cast in two ounces of red Lead: Let them boyl with continual stirring til they begin to look black and grow thick; by and by add two ounces of Pitch: Afterwards by degrees strew in two ounces of white Vitriol poudrered, then add two ounces of Litharge: and at length when they are almost boyled to a just thickness, add one ounce and half of Tacamabacca; stir them again and boyl them to the consistence of a Plaister.*

Gulielmus Fabricius Centur. 5. Observ. 67. propounds such a one.

Take *of the Plaister Slotanum half an ounce, new Wax two ounces, Osteocolla one ounce, Pouder of the roots of the greater Comfrey,* Terra Sigillata, *of each three ounces; Pouder of Pomegranate flowers, Cypress Nuts, red Roses, of each one ounce; Oyl of Roses or Mastick as much as wil suffice; mix them.*

But before such Plaisters and Plates be laid on, it wil be good for some time before to foment the part with the following Decoction, and to anoynt it to mollefie it, if any thing be hard, that it may be rendered more fit to be replaced. As,

Take *of Sage, Marsh-mallows, Flowers of Camomile, Melilote, St. Johns-wort, of each one handful; let them be boyled for a Fomentation.*

Take *of Oyl of Worms, of Orrace, of white Lilies, of each one ounce; Oyntment of Agrippa half an ounce, Dialtheæa one ounce; mix them.*

A Luxation of the Vertebræ *inwards*

Secondly, if the *Vertebræ* be luxated inwards, the restitution of them is altogether more difficult; yet in tender bodies, if the Evil be new, some Plaister firmly sticking to the Skin may be applied to the place affected; and the luxated *Vertebræ* may be drawn forth thither.

In those of riper age *Guil. Fabricius*, Cent. 5. Observ. 69. thinks an extream Remedy is rather to be attempted, then to relinquish the Patient, who otherwise must lead the miserable life of the Disease, or die. To wit (as *Fabricius* teacheth) Incision must be made with a Knife even to the descending appendix of the *Vertebra*; then through the same Wound putting in the Knife again, two Incisions more must be made, one to the right, the other to the left side of the Appendix; then the

Appendix

Appendix being laid hold on by Inſtruments fit for this purpoſe, it muſt be drawn upwards, and the *Vertebra* replaced in its natural ſeat: but in the interim whiles theſe things are done, it muſt needs be that the Back bone be extended, for the *Vertebra* wil the eaſier ſtart into its natural poſition. The Wound muſt be ſmal or great according to the greatneſs of the diſlocation; for if only one *Vertebra* be preſt in, a ſmal Wound wil ſuffice, but if two or more, it muſt needs be great, that both the luxated *Vertebræ* may be laid hold on. If a Flux of blood do hinder, ſo that the operation cannot be done preſently after Inciſion is made, it muſt be ſtopt with Hurds cloſely wreathed up, and wet with the White of an Egg, and ſtrewed with a pouder to ſtop blood; where this muſt be obſerved, that the whole Wound, eſpecially on each ſide of the Appendix be moſt carefully filled up with thoſe Hurds; but that this may be done commodiouſly, many little pillows muſt be made of Hurds wreathed up into this faſhion, and ſo one after another muſt be thruſt into the Wound, til it be filled; afterwards let ſome Plaiſter that wil ſtick faſt be applied, and let it be bound with a Rowler; after ſome hours when the blood is ſtopt, the Hurds muſt be taken out gently, that the blood break not forth again; afterwards the Inſtrument muſt be applied as was ſaid, but the Inſtrument muſt be ſtrong and toothed, as we uſe in drawing forth a Stone, if two *Vertebræ* be luxated, both muſt be laid hold on, and that with two Inſtruments.

There muſt therefore be two Chirurgeons, who muſt equally and with one conſent draw upwards; moreover let the Chirurgeon have a care, that the Inciſions be not made too deep at the ſides of the Appendix, by reaſon of the Nerves which proceed from the ſpinal marrow to the ſides of the *Vertebræ*; moreover it is neceſſary, that this operation be done at the beginning of the Diſeaſe, while the ſtrength is firm, and before the part affected is poſſeſt with an Inflammation and Tumor; neither makes it any matter whether the Patient be without Speech or Underſtanding, which ſomtimes happens. But if the Chirurgeon be not called at the beginning, the ſecond, third, or fourth day at leaſt before the operation the place muſt be fomented with the Decoction of Betony, Primroſe, Sage, Camomile, Melilote, Roſes and Juniper berries; to which he may add ſome things mollefying as Mallows, Marſhmallows, and then try to reduce them; after the operation the Back muſt be anoynted with Oyl of Roſes and Worms, and the Wound alſo muſt be handled after the manner of other contuſed Wounds.

I have writ in the place alleadged, that this operation ſeems to me not ſafe enough, and to which few wil ſubmit; although *Guil. Fabricius* with *Celſus l.* 3. *c.* 33. affirms, that it makes no matter, whether the Remedy be ſafe or not, which is the only one; and he thinks this operation is not ſo dangerous, ſince that in the middle of the Back there are no great Veſſels of Veins and Arteries, beſides the Nerves in the Appendixes are ſmal.

Of the Luxation of the Ribs hath been ſpoken, *l.* 2. *p.* 2. *c.* 25.

Chap. 6. *Of a Luxation of the Shoulder.*

THe Shoulder bone with its round head covered every where with a Cartilage is joyned to the boſom of the neck of the Shoulder-blade by a moſt perfect manner of Articulation, and moſt commodious for the undergoing and performing of all motions, and when as this boſom is not deep enough engraved to receive the head of the Shoulder, leſt this Joynt ſhould be ſubject to often Luxations, provident Nature hath provided by ſtrong Ligaments and a peculiar proceſs, and moreover beſides the Cartilage with which ſhe hath pargetted over this boſom, ſhe hath joyned another about it, which indeed grows not to the boſom; yet being tied with Ligaments begins thicker and by degrees is extenuated towards the Center: yet if a violent cauſe come this Joynt fals out oftener and eaſier then the reſt.

The Differences.

But this Joynt falls out downwards (for the moſt) part or under the Arm-pit hole; for whereas (as *Galen* renders the Cauſes of this buſineſs, *l. de artic. tex.* 2.) there are ſix places about every dearticulation, Above and Below, Before and Behind, Without and Within, the inner part of this Joynt by which it tends plainly upwards hath a fleſhy part of a Muſcle caſt over it, which by ſome is called *Deltoides* from its likeneſs to the Greek letter Δ; but by that part it declines towards the Neck it hath the back of the Shoulder-blade, where by the conjunction with the Neck-bone the top of the Shoulder is made which is called the *Acromion*; where it looks inward, that proceſs meets with the Shoulder-blade, which for its faſhion ſome cal the Anchor-like, ſome the Corniculer proceſs, which wholly forbids that the Joynt fal forth into that part. But that it may fal into the hinder part, whenas there it leans on the Shoulder-blade, Who is there amongſt us that can ſo much as conceive it? There are four parts then remaining, which want a Guard, into which it is likely the Joynt may fall. *Hippocrates* in the alleadged place admits of no other Species of Luxation of the Shoulder but under the Arm-pit; nay he plainly denies that it can fal forth to the fore part; yet *Galen* hath ſeen it five times, once in *Aſia*, and four times at *Rome*; and no wonder, whenas in the Cities where *Hippocrat.* lived there were ſcarce ſo many Men, as in one Street at *Rome*; and therefore there were more Examples of Diſ-

eases, especially the wraſtling place coming into use, by which their Limbs were diversly distorted and perverted. *Parry, l.* 15. *c.* 21. 29. and 30. adds two differences more, viz. upwards and outwards, but those are very rare, and you may see the places alleadged concerning them.

But 'tis doubted whether the shoulder can suffer only a perfect Luxation, or also a Subluxation. *Hippoc.* 1. *de artic. tex.* 22. denies it, and not without cause and reason; for whenas the head of this joynt is round, and inserted into Cavities which have their brims round, it cannot stay in them; and this is altogether true, if the Luxation happen from an external violent cause; but if the thick humors flow into the bosom of the shoulder-blade, and there by their long stay do stick concreted and hardened, they may by degrees thrust the head of the shoulder out of its seat, and cause an imperfect Luxation; yet this happens seldom in the shoulder, more often in the Hip.

The Causes.

From which it appears now that the Cause of a perfect Luxation of the shoulder is a violent cause, a fal, a blow, vehement extension or distorsion of the Arm; but the cause of a Subluxation is a thick humor fallen into the bosom of the shoulder-blade.

Signs Diagnostick.

That the shoulder is fallen under the Arm-pit is easily known, and it is most certainly shewn by its proper and inseparable sign, viz. somwhat round and hard under the Arm-pit is sensibly obvious to the touch, to which notwithstanding other signs also are added, not proper, but common; for there appears an unusual Cavity at the top of the shoulder, but that is a common sign, both of the shoulder fallen forth, and of the broad bone of the shoulder blade. In which things that Physitians are often deceived *Galen* teacheth at large both by his own and others example, 1. *de artic. tex.* 61. the same falling forth of the shoulder is shewed by its unlikeness compared with the sound one, by a sharp bunching out as it were of the upper process of the shoulder-blade, by a departing of the Elbow from the Ribs more than usual, and the difficult and painful bringing of it to them; and the exceeding length and inequality of the same compared with the sound one (unless the shoulder fallen downwards be nevertheless drawn up by the Muscles) and the imporency of the Arm to any motion; which sign also is not inseparable, whenas the Muscles about the shoulders what way soever hurt whether by a Luxation, or by any other Cause, are unfit for motion.

If the shoulder be fallen forth to the fore part, there is seen an unusual Cavity in the hinder part, and too great a bunching out in the fore part, the head of the shoulder is distorted towards the Breast, the Elbow tends to the hinder parts, and is with difficultly stretcht out to the fore parts, and the signs are wanting of a shoulder luxated into the Arm-pit.

Prognosticks

1. The head of the shoulder fallen to the fore part is easier reduced than if it be fallen into the Arm-pit.

2. An old Luxation of the shoulder is very hardly reduced, and being replaced it fals forth again.

3. They who have their shoulder reduced (which is true also of other joynts) the parts adjoyning being affected with no Inflammation, may presently use their shoulder without any pain; and these think they have no need of any further care or providence, but 'tis the Physitians part to correct their opinion; whenas these have their shoulder more easily fal forth again, then those whose neighboring parts are possessed with an Inflammation, for these cannot use their joynts.

4. They whose head of the shoulder could not be reduced, if they grow stil, that shoulder is not equally augmented as the sound one; and though it be augmented somwhat, yet it is rendered shorter than the other; which happens by reason of the compression of the Muscles and Veins, and because the whol joynt is immovable; but in those who at ripe age have the head of the shoulder break forth, and 'tis not restored, the part which is above the joynt is extenuated, and becomes more slender habited.

The Cure

That the joynt of the shoulder fallen forth to the Arm-pit may be restored into its seat from which it fel, three things must be done, as *Galen* teacheth, 1. *de artic. text.* 5. First the head of the shoulder is to be forced to the fore part, then to the upper part, at last to the hinder part, to wit that a contrary way to the Luxation may be undertaken; for the head of the shoulder departing from its proper bosom is first forced to the fore part, secondly by its weight 'tis carried downwards, thirdly 'tis drawn backward to the Arm-pit hole by the Muscles. But if the shoulder be fallen forth to the fore part, it must be forced a contrary way to the hinder part; yet that it may be freed from the Muscles with which it is detained, there must first be some extension of the shoulder made, yet but little.

But the waies of reducing it, as we may see in *Hippocrates.* 1. *de artic.* and other Authors, are various, of which we wil reckon up the chief and most usual, and those which require least preparation, and are most safe.

The

The first way of reducing a luxated shoulder

The first way is by bringing about the head of the shoulder about the neck of the shoulder-blade, to wit, when the Chirurgeon puts his hand most straightly under the Arm-pit, and wheels about the shoulder with the other hand, that the middle joynts of the fingers force it into its Cavity; which way indeed wants not its danger; for by the circumvolution not only the nervous and membranous bodies, but also the brows of the bosom may be razed, nay the Cartilage compassing the bosom cannot easily be pulled or hurt without great dammage; yet it hath its place in children and other softer bodies, so that the Chirurgeon do exercise it warily.

The second way

The second way is by the heel, after this manner: The Patient must be laid with his back on the ground, and between the hollow of the Arm-pit, the head of the shoulder and the ribs, a bal of a middle size made of Leather or some other matter not very soft must be fitted to it; but the Chirurgeon sitting right against the Patient let him apply his right heel, if the right shoulder be luxated, or his left heel if the left, upon the bal put under the Arm-pit, and with both hands let him draw the shoulder downwards (when the head of it is rapt upwards by the strength of the Muscles) but with his heel let him drive the shoulder at once to the fore part and upwards; and at last let him force backwards the head of the shoulder into the Cavity of the blade; the which he may easily do, whenas the Muscles do not only much help this motion, but oftentimes alone do wholly perfect it. Two Servants may make this way of reducing easier, the one of which with a swathe or rein may draw the shoulder-blade upwards towards the head of the Patient, and by this means facilitate the motion downwards, but let him press with his foot the top of the shoulder, and so he wil hinder the shoulder-blade from following, whiles the Chirurgeon draws the shoulder downwards; but let the other hold the opposite sound Arm, and by this means he shal hinder that the whol body do not follow upon the extension made by the Chirurgeon on the affected side. And this way because it is done by a way contrary to the falling forth of the bone, and with extension too, is almost natural, safe, and not so laborious: yet because it wants an impulse, *Galen* thinks it recedes from a convenient manner.

The third way

The third way is by a Ladder, and 'tis also safe and commodious enough; to wit a Ladder is raised up firm and fast, upon whose uppermost step there must be bound some round body, which must be fitted to the Arm-pit of the Patient, and may drive forth the head of the shoulder; at the bottom of the Ladder a footstep is placed which the Patient gets upon; afterwards his Arm-pit is placed over that round body, the luxated Arm is drawn downwards by the Chirurgeon, and the shoulder is moved up and down, in the interim the sound Arm is most strongly drawn downwards at the same time by a servant on the opposite side, and the foot-stool together is drawn from under the feet of the Patient, that he remains hanging on the Ladder, and by this means the shoulder is restored.

The fourth way

The fourth way differs not much from this, which is performed by a Pestil. To wit, the Pestil is wrapt up with some soft Swathe, and is thrust between the side and the head of the shoulder, but it must be of that length that the man standing may almost hang upon it; but if it be shorter, let the man sit so that he can scarce cast his shoulder over the Pestil, then let the shoulder and arm be extended along the Pestil, but let another force his body the other way, flinging his hands about his Neck neer the Throat; but this way is not so safe, whenas the Pestil under the Arm may easily give way, and there is danger lest that the body slide to this or that part upon extension made on both sides.

the fifth way

The fifth way seems more commodious, which is done by putting under a shoulder, (they cal it Subhumeration or under-shouldering) after this manner; let a strong servant and of tal stature put the pit of the Patients Arm over the sharp part of his shoulder, and let him draw the luxated shoulder towards his Breast most quickly and strongly, that the Patient may as it were hang on his shoulder, by which means both the Arm wil be extended and the head of the Shoulder moved to the fore part; in the interim let another Servant standing at the back of the Patient press the top of the shoulder that the shoulder-blade follow not with it; let him shake it, and so rule those violent motions with his hands that the luxated Shoulder be reduced into its Cavity ingraved in the shoulder-blade. If the Patient be light, let a Boy or some other heavy weight be hanged at his back; lest upon the extension of the Shoulder the whol body do follow, and al the operation of the Chirurgeon be hindered.

the sixth way

A new way of reducing the shoulder

The sixth way, which by *Hippocrates* is counted the most commodious, is described by him, *1. de artic. tex.* 19. which *Ambrose Parry* makes yet more commodious, *l.* 15. *c* 27. which may be seen there: to which way yet some Art may be added, if the Patient sit immovable on a bench, and there be two pieces of wood four or five fingers broad, two fingers thick; one being erected perpendicular must be fastened to its Basis, which must be fashioned to the form of a Cross, of that length that if it be set on the bench on which he sits, it may almost reach under his Arm-pit, which in the upper part must have a point according to its longi-

tude, into which the other may be put; but let the other be almost three Ells long, and at one end let it have another piece of wood prefixt across almost half an Ell long. Let this wood be a little hollowed an Ell long from its end to which the other wood is prefixt, that it may be inserted to the other piece of wood that is erected, but with the other end touch the bench. Now let the Patient sit unmoved on the Bench, and let that long piece of wood resting on the other erected perpendicular be so moved to him that that cross piece of wood may be straightly set under the Arm-pit of the Patient, in which part the Luxation is; let the Patient extend the Arm that is hurt upon that cross piece of wood towards the bench; then let a swathe or rope be cast about the affected Arm about the Elbow (a long Towel is most commodiously used) and let the Arm be wrapped with it til below the Elbow, so that the swathe end in two handles, on each side of the Arm and cross piece of wood; now let the drawing Engine which rests on the bench, such as are used to draw up cross bones, be applied to the end of the cross piece of wood; for which cause let that cross piece of wood with a wooden stake be driven in a cross not far from the end, and the two hooks of that drawing instrument in its upper part be laid hold on with the two handles of the rope or towel; which when 'tis done that Engine must be brought about, as is wont to be done in binding of a bone. For so the Arm is extended by degrees, and is drawn downwards, and the joynt fallen forth is promoted into its place, into which it is drawn and slips either of its own accord by the motion of its Muscles, or by help of the Chirurgeon it must be forced thither with his hand.

Which way differs from the draft of the *Ambi* described by *Parry*, in this; first of al that instead of the Pillar B. made with two pieces of wood, here is a pillar of one piece, which in its upper part hath a point, which is sent into the bosom of the *Spatha* A. hollowed in the lower part; next of al in place of that *Spatha* or *Ambi* there is a piece of wood which reacheth from the Shoulder even to the Bench on which the Patient sits. Thirdly, because that *Spatha*, which is put under the Shoulder hath not a round head, but a cross piece of wood prefixt, which is sent under the Arm-pit. Fourthly, because the Arm is not bound to the *Ambi* or *Spatha*, but only lies upon it, but the swathe which is cast upon the luxated Arm on both sides of the Arm is made fast beneath to that drawing Engine.

For brevity sake we omit many more waies of reducing which present themselves every where in Authors: and of these we have now reckoned up, and others, we may sometimes use this, sometimes that, as they are ready and at hand; for it is not safe to defer the reducing long, til more laborious Instruments are acquired.

The shoulder luxated to the fore part

If the Shoulder be luxated to the fore part, 'tis restored almost the same waies as when 'tis fallen into the Arm-pit, to wit, by extending the Shoulder, and drawing its head up and down, and forcing it into its Cavity: It differs only in this, That in this kind of Luxation the shoulder being drawn downwards must be driven to the hinder part; but the Chirurgeon must have a diligent care, lest the head of the shoulder in the action do fal down into the Arm-pit, which may be done if the Arm-pit be filled up with a bal or some round thing of a just bigness; and this operation may be facilitated by a servant standing at the back of the Patient, and with a rope or strong and broad swathe drawing upwards the shoulder-blade, lest that follow upon the extension of the shoulder made by the Chirurgeon.

The shoulder being reduced, Medicines that do hinder Inflammation and strengthen the relaxt and soft Ligaments must be applied; of which we made mention in the precedent part concerning Fractures, and above Chap. 1. of Luxations in general: the most convenient way of swathing is if a bal made up of Linen or course flax, and dipt in convenient Medicines, be put under the Arm-pit, that the head of the shoulder return not thither; let the first swathe be here, afterwards let it be rowled once or twice about the joynt; hence let it be brought to the shoulder-blade, and again descend to the joynt: at last that it may draw the Arm the more upwards, and keep it so, let it tend to the neck on the other side, and there be bound, neither let it be loosened before the third or fourth day, unless an Inflammation command otherwise. But the swathe being taken off, or laid on, some Cerote must be applied, viz. *Diapalma* if it be Summer, or if it be Winter, *Barbarum* or *Oxycroceum*.

The loosening of the tops of the broad bone of the shoulder blades

Last of al, we must not pass by here the Luxation of the top of the broad bone of the shoulder-blade, of which *Hippocrates* 2. *de artic. tex.* 62. hath these words: *But in those in whom the top of the shoulder is pulled off, the bone which is pulled off is seen to stick out. But the bone is that which joyns together the throat and shoulder-blade, whenas in this part the Nature of man is different from other Creatures, Physitians therefore are wont to be most of al deceived in this wound; for when the bone pulled off sticks forth, the upper part of the shoulder appears low and hollow, that they use the means as if the shoulder were fallen out: truly I have known many Physitians in other things good enough, who whiles they endeavor to reduce such shoulders, thinking they were fallen out, have caused much hurt by troubling them, and have not given over til they have changed their opinion, or thinking they had reduced the joynt*

joynt they knew not what they should do more; the Cure of these is this, as to others of the like sort, a Cerote, Bolsters, Linen Clothes, and Swathing made after this manner: the bone sticking out must be forced downwards, and on that part many Bolsters must be laid, and they must be prest down very wel, and the Arm must be fastened to the Ribs towards the upper part and kept so; for by no means whatsoever can it be done, that the bone pul'd off can come close and grow together; yet we must wel know, and foretel also that these things are safe, if you would have it otherwise, because neither smal nor great hurt happens to the Shoulder by this Wound, only the place becomes more deformed. For whenas neither this bone can be restored to its ancient seat, after the same manner as it was by Nature, but it must needs be that it becomes little or much strutting out at the upper part; neither doth any thing else return wholly into the same state, which communicating and cohering with another hath been pul'd off from its ancient coherence. In a few daies the pain at the top of the Shoulder is asswaged, if it be bound down rightly. Thus much *Hippocrates*; see *Galen* also in his Comment.

Chap 7. *Of a Luxation of the Elbow and* Radius.

THe Elbow and *Radius* are joyned with the lower head of the Shoulder. The Elbow by a *Gynglymus*, that is, by that kind of Articulation in which the bones joyned together do mutually receive and are received by one another; for the Shoulder hath in its lower part two bosoms, the former or lesser of which receives the outer process of the Elbow; but the hindermost or greater is devoted to the hinder process of the same; but for receiving of the *Radius* the Shoulder hath also a peculiar head, called the outer head.

The Differences.

From which we may easily collect, that the Elbow may not only be wholly and perfectly luxated, but also may suffer a subluxation: next of all that it may be luxated into al the four Differences of place, forwards, backwards, outwards, inwards; but the *Radius* as sometimes it follows the Elbow luxated into any part, but sometimes staies in its place; so sometimes it alone fals from the Elbow, without any luxation of it.

The Causes.

As the Luxation of other parts proceeds from violent Causes, so this also; and indeed the Luxation of the Elbow to the fore part (for the most part) is from a violent and sudden extension of the Arm; to the hinder part, from a violent bending of the Arm, and outwardly or inwardly, from a perversion of the Arm; the Causes of a subluxiation are humors flowing to the Joynt, which by degrees do fil up the Cavities engraved both in the lower part of the Shoulder-bone, and also in the Elbow and *Radius*, and do thrust forth the Elbow or *Radius* out of their seat.

The Signs Diagnostick.

It is easily discovered by the Sight and Touch into what part the Elbow is luxated; for if it be fallen to the fore part the Arm is extended and cannot be bent; in the fore part there is seen an unusual Tumor, but in the hinder part an unusual Cavity; things contrary to these do happen, if it be luxated to the hinder part; to wit, the Arm is crooked, and can by no means be extended; the Tumor appears in the hinder part, but the Cavity in the fore part. A Luxation to the outward part makes also a bunching out in the outer part, but a bosom in the inner part; but on the contrary, if the Elbow be fallen to the inward part, there is an eminency less then should be in the inward part, and a Cavity in the outer part.

If the *Radius* follow the Elbow, 'tis known by the same Signs; but if it only depart from the Elbow without a Luxation, a gaping and disjoyning shews it, the place is hollow, and 'tis easie to find a bosom with the Finger.

Prognosticks.

1. The Elbow as it doth not easily fal forth by reason of its firm and fast coarticulation with the Shoulder, and its plenty and strength of Ligaments; so being fallen forth it is hardly restored.

2. The Elbow luxated unless it be most speedily reduced, doth not only bring divers and dangerous Symptoms, to wit, a most exceeding pain, Inflammation, Fever, Convulsion, but sometimes also Death.

3. Of all Luxations which happen in the Gibbous part of the Elbow, the most dangerous and painful is that which is to the hinder part. *Paulus Ægineta, de re medic. l. 6. c. 115.*

4. When the Bone of the Elbow is divided from the other Bone, it is not easily restored; for neither do two bones, which are joyned together, when they once gape, easily return to their ancient place; but it must needs be, that the Bones being so divided, the part becomes swelled, and the bones are quickly compast with a *Callus*.

The Cure.

The Elbow being imperfectly luxated (or subluxated) to the fore part is most easily restored by moderate extension and only bending of the Arm, but a perfect Luxation is harder to be reduced, and requires greater provision; for first there must be extension made and that obliquely (lest the high brow of the Elbow hurt the head of the Shoulder) by two Servants, one of which must draw the top

of

of the Shoulder upwards, but the other the Elbow downwards, either with their Hands only, or if need be with Reins; then some round body must be placed by the brawny part; over which afterwards the Chirurgeon bending his Arm, and suddenly forcing the Elbow to the hinder parts, may restore it into its place.

Hippocrates 3. *de fractu.* affirms that he hath sometimes cured the Elbow luxated to the hinder part, only by a sudden and continued extension of the Arm; which if it suffice not, convenient extension being made the Elbow must be driven inwards.

The Elbow fallen forth to the outer or inner part is most easily reduced, if extension being made, it be forced from that part into which it is fallen, into the contrary.

The same manner of reducing is to be observed in replacing the *Radius*, if it hath followed the Luxation of the Elbow; but if it be only departed from it, it must be prest with the prominent parts of the Hands, and the Arm must be reduced to the natural figure; it being reduced convenient Medicines must be applied, and it must be bound up fitly, as was said in general before, *c.* 7.

Chap. 8. *Of a Luxation of the Hand and its Fingers.*

HEre by the name of Hand we understand the Wrist, and After-wrist; but the Wrist is joyned with the Elbow bone and *Radius* by a *Diarthrosis*, whenas there is a manifest motion; but with the After-wrist, whenas there is no manifest motion, by a *Synarthrosis* or doubtful articulation; the *Metacarpium* or After-wrist is joyned again with the bones of the Fingers by a *Diarthrosis*, because the round heads of the four bones of the After-wrist do conspicuously enter the superficies of the first bones of the Fingers, lightly hollowed; and after this manner also, the bones of the Fingers themselves are joyned one to another.

The Differences.

Whence we may easily collect, that the Wrist may be luxated into all four parts, to wit, the fore, the hinder, and to the sides: all the bones of the After-wrist indeed are luxated inwards and outwards, but the falling of the two middle bones to the sides is hindred by the two extream bones that have respect to the little and Fore-finger, the which two only may fall forth to that side which is free from bordering bones. The bones of the Fingers again are luxated four waies, to wit, inwardly, outwardly, and to the sides.

The Causes.

The Cause of the Luxation of the Wrist, After-wrist, and Fingers, as of other luxations, is some violent Motion, Blow, Fall, Perversion, and Contorsion.

Signs Diagnostick.

The Signs of all parts of the Hands luxated are almost common; for whether the bones of the Wrist, After-wrist, or Fingers be luxated to the fore part, a Tumor appears at that place in the fore part, and the Fingers cannot be bent.

If they be fallen to the hinder part, a Tumor also is perceived in the hinder part, and the Fingers by reason of the compression of the Tendons and Nerves going to them cannot be extended.

But if a Luxation be made to the sides, a Tumor appears in that part into which the fall is made; and a depression into that from which the Joynt is fallen.

The Prognostick

The Luxation of these parts is not dangerous, whenas they may easily be restored into their place.

The Cure

The bones of the Wrist, into what part soever they be luxated, may be without any extension at all reduced into their place, after this manner; let the Hand of the Patient be placed upon a Board or Table, and that with the palm downward if the luxation be to the hinder parts; but with the back downwards, if it be to the fore parts; afterwards let the Chirurgeon most strongly force the luxated Joynt to the contrary part, either with the palm of his Hand in more tender bodies; or with his Heel, in bodies that are stronger.

The same rule is observed in replacing the bones of the After-wrist and Fingers, except that some servant holding with one Hand the Fingers, with the other Hand the Arm; doth make a light extension; the bones being reduced, Medicines that hinder an Inflammation and strengthen the Joynts must be applied, and the part must be conveniently bound up and placed.

Chap. 9. *Of a Luxation of the Thigh.*

THe Thigh-bone, the longest and greatest in the Body of Man, at its upper part with its head sufficiently great, thick, and exactly half Globous, is not only most exactly half joyned by an *Enarthrosis* to the bosom of the Hip sufficiently large and deep to receive this head, but also is most strongly united to it by a most firm Ligament arising from the bosom of the Hip, and implanted into the narrow bosom of the head of the Thigh, to the end that the Thigh might by so much the easier and more readily be bowed, extended, moved to the sides, and turned about, and not easily slip forth.

The

The Causes.

The Causes of a perfect Luxation of the Thigh are the same as of the Luxation of the Shoulder, to wit, external and violent, a fal, a blow, or some other violent and indecent extension and distorsion of the Thigh; but the causes of an imperfect Luxation are the humors flowing to this joynt, and by degrees thrusting it out of its seat.

The Differences.

But this joynt fals forth to four parts, the former, hinder, but seldom, whenas the brow of the Cavity in this part is higher;) to the outer and inward part most often, whenas at that place the brow is lower; and sometimes the Thigh admits of a Subluxation from an internal cause; whence when *Paulus Ægineta, lib. 6. de remed. c.* 118. writes that the Articulation of the Hip doth only suffer a Luxation and not a Subluxation, that is to be understood of that only which is from an external and violent cause; for we see oftentimes that by a flux of humors some have the Ligaments in the Thigh relaxt and mollefied, that they cannot retain the head of the Thigh-bone firmly in its Cavity, whence follows a certain Subluxation.

Signs Diagnostick

the Diagnostick signs of a thigh luxated to the fore part.

If the Thigh be luxated to the fore part, a Tumor appears about the Groins, whenas the head of the Thigh leans to the *Pubes*; the Buttocks on the contrary, by reason of the Muscles contracted with the Thigh to the *Pubes*, seem wrinkled; the Urine is suppreſt by reason of the compression of the bladder by the head of the Thigh, the external Thigh can neither be bent nor brought to the Groin, whenas the head of the Thigh is in the very bending place; the man is also in pain if he be forced to bend his Knee, by reason of the former Muscle, which ariseth from the bone which belongeth to the Loyns; for that is compreſt, and being retcht is lift up by the head of the Thigh, and whenas it can be no further extended, it resists; otherwise it equals in length the whol found Thigh to the Heel; for the Thigh going forth of its Cavity comes to the fore part and a little lower, by which it comes to pass that the Thigh hurt equals the length of the found one, which especially fals out so at the Heel; the Toes of the Foot cannot easily be extended, nor turned to the ground, whence in walking the Patient is compelled to tread only on the Heel. But in them who at strong age have this joynt fallen forth into this part, and not restored, they when the pain ceaseth, and the joynt is accustomed to be contained in that place into which it is fallen, can forthwith go upright without a staff, and wholly upright; for by reason of the inflexibility of the Groyn they use the whol Thigh more straight in going, than when it was found; sometimes also they draw their foot upon the ground, whenas they cannot easily bend the upper junctures which are at the Groyn and Knee, although they walk upon the whol foot; but in those at whose tender age this joynt fallen forth is not restored, their Thigh-bone is more diminished than that of the Leg or Foot, but the Thigh is little diminished, only the flesh every where is abated, especially at the hinder part.

to the hinder part.

If the Thigh-bone be luxated to the hinder part, there are contrary signs to those mentioned, to wit, The Head of the Thigh being fallen to the Buttocks is discovered by a Tumor about those parts, both by the sight and touch: the Groyns on the contrary appear more loose; the affected Thigh by reason of the compression and distension of the Muscles compassing the head of the Thigh cannot be extended, and 'tis rendered shorter than the found one; the heel doth not touch the ground, whence the Patients can neither stand nor go, but fal headlong backwards, because the body slides to that part, and the head of the Thigh being out of its proper place is not directly opposed to underprop the body; yet the man may bend his Thigh if he be not hindered by pain; for whenas the head of the Thighs is by force with its whol neck expelled into the great Muscle of the Buttocks, which extends this Articulation, this Muscle admitting the head of the Thigh fallen forth is most of al tormented, whenas 'tis distended and preſt under it, and of necessity must be seized on by an Inflammation; but in process of time, when this Muscle is freed from an Inflammation, and contracts a certain glutinous humor, that part of it which toucheth the joynt grows to a Callus, and the Knee is bent without any pain; moreover the head of the Thigh being luxated to the hinder part, the Thigh and Foot appear moderately straight, and do not incline much one way nor other.

But when in ripe age the Thigh-bone fallen forth is not restored, when the pain is ceased, and the joynt accustomed to be turned in the flesh, the man indeed may walk, yet he is forced to bow very much towards the Groyn when he walks, and that for two reasons, Because the Thigh is rendered much shorter, and the heel is far off from touching the ground; for if he try never so much to stand on that foot, leaning upon no other thing, he wil every where fal backwards; but if in tender age this joynt luxated after this manner be not reduced, the Thigh-bone is made short, and the whol Thigh is spoiled, and is less increased, and made slenderer, being for no use.

To the outer

If the Thigh be luxated to the outer part, it is known by these signs; Between the *Anus* and Cod there is seen a Cavity and leanness; on the contrary

in

in the buttocks a certain Tumor; the Thigh by how much the head of it is fallen forth to a higher place, is rendered shorter; the Knee with the Leg looks inwards: the Heel toucheth not the ground; whence when the Patient would walk he goes only a tiptoes.

And if in those of ripe age this Joynt be not restored, but the flesh into which the Joynt is fallen grows callous, and the pain therefore ceaseth, they may go without a Staff; and therefore when they use their Thigh, in these the flesh is less offended; but they to whom in tender age this misfortune happens, require a diligent care; for if they be neglected, the whole Thigh becomes unprofitable, and is little increased; the flesh also of the whole Thigh is more abated, then in the sound one.

to the inner. Lastly a Luxation of the Thigh to the inner part is known this way; the Thigh is longer if it be compared with the other, and that for two reasons; for the head of the Thigh sticks to the bone which proceeds from the Hip upwards to the *Pecten*, and the neck of the Joynt is sustained in its Cavity; again on the outer side the buttock appears hollow, because the head of the Thigh is fallen to the inner part; and the Thigh towards the Knee is forced to look outwards to the outer part; in like manner the Leg and Foot, whenas in all luxated bones one extreamity alwaies looks to the contrary part to that which is fallen forth.

They whose joynt is fallen forth after this manner, and not reduced, when they go they wheel about their Thigh outwardly; for whenas the faulty Thigh is made longer, and by reason of weakness they cannot readily bend the bone, and by reason of pain they refuse to do it, it remains that they must bring it about.

See more of these things in *Hippoc.* 3. *de artic.* from *t.* 68. to *t.* 105. all which for brevities sake I would not transcribe hither.

Prognosticks.

1. There is great danger in the Thigh, lest that it be hardly reduced, or being reduced that it fall out again. *Celsus l.* 8. *c.* 20.

2. An old Luxation of the Thigh, which hath already contracted a callus, and in which the bosom is filled up with humors, is judged incurable.

3. If by reason of the plenty of the humor collected in the Cavity that Ligament be preternaturally extended, that it cause the Thigh to be moved out of its seat, or if the same Ligament be so relaxt by the humor that it cannot contain the bone in its seat, although the bone be reduced yet it staies not in its place, but fals out again, viz. if the humor remain; but if the humor be dried up, the Joynt may remain in its seat, of which *Hippocrates* 6. Aphor. 60. *They who being troubled with a long continued pain of the Hip have the head of the Thigh fallen forth of the Hip, their Thigh wasteth, and becomes lame unless they be burnt.*

4. The same comes to pass if that Ligament be broken.

5. If the luxated Thigh be not reduced, the neighboring parts are wasted by degrees, for both the Arteries and Veins are streightened and compresst, that there is not a free passage open for the blood and spirits to those parts; and because the part is not moved after its due manner, the heat fadeth, whence the nourishment of the part is not rightly accomplisht, and the Thigh-bone is not encreased according to the proportion of the rest of the bones.

The Cure.

Whereas after the same manner almost as the Shoulder is joyned with the Shoulder-blade, so the Thigh is with the Hip-bone, so the way of reducing them both is almost the same. The Patient must be placed upon a Bench or Table, putting a Pillow or Bed under him, with his Face downward if the Luxation be made outward or backward, with his face upwards if inwards, and upon his side if forwards; and this reducing is done sometimes only with the Hands without any extension; as first of all either let the head of the Thigh be so long wheeled about the Loyns till it come into its Cavity (which way notwithstanding is not so safe) or secondly (to wit, in a Luxation made to the inner part) let the Thigh most quickly and strongly be bent to the Groyns, and by this means let the head of the Thigh fallen forth be forced outward into its place; but if no good be done by these waies, the Patient must alwaies be so placed, that the part into which the head of the Thigh is fallen, be uppermost, but that from which it is departed, lowermost; afterwards convenient extension must be made, and at length the Thigh must be forced into its Cavity alwaies a way contrary to its falling forth; but how a lawfull and convenient extension is to be made, either with the hands, to wit, in soft bodies a new luxation; or with Reins, Ropes, and the like, to wit, in strong bodies and an old luxation, doth sufficiently appear from those things which are said in the precedent part, *c.* 11. of the Fracture of the Thigh; and truly the extension may be common to the four species of a luxated Thigh; but the manner of forcing and restoring the head of the Thigh into its place varies according to the variety of the parts to which it is fallen: for that which is fallen inwards must be forced outwards, that outwards, inwards, and so of the rest; when the bone is reduced, which is known by the free motion of the Thigh and without any pain, the Medicines of which we spake formerly in general, *c.* 1. must be laid on the Joynt, and with rowling the Joynt must be kept in its place; straw beds also as in Fractures must be applied, and both Thighs be

be kept in its place; straw beds also as in fractures must be applied, and both Thighs be bound that the luxated Member may be kept in its place; and this provision must not be loosed before the fourth day; and let the Patient keep himself long enough in bed, nor let him walk, lest by unseasonable walking the bone fal forth again.

See more in *Hippocrates*, *Paulus Ægineta*, *l.* 6. *c.* 119. *Ambrose Parry*, *l.* 15. from *c.* 39. to *c.* 48.

Chap. 10 *Of a Luxation of the patel Bone*

THe Thigh in its lower part hath two eminent heads tending to the hinder part, with which it is inserted into two bosoms of the leg-bone, only superficial ones, and no waies deep, and pargeted over with a smooth cartilage; it hath moreover in its hinder part a certain bosom, into which the bunching forth of the Leg-bone that stands forth betwixt its two bosoms is inserted: but lest that by reason of this looser Articulation, which is by a *Ginglymus*, the Knee should be subject to frequent Luxations; on the fore part the patel bone is set over the bone of the Thigh and Legg, and firmly joyned to them by benefit of the thick Tendons of the Muscles extending the Leg; besides on the out side of the greater bone stands the Bracer, which at its upper part in the inner side hath a bosom covered with a Cartilage, by which the little side head is received, which subsists at the upper Appendix of the great Bone; but at its lower part, with its acute angle 'tis inserted into the external and oblong bosom of the lower Appendix of the great Bone, and makes the outward Ankle: whenas therefore here concur many Articulations, also many Luxations may happen.

A Luxation of the Knee-pan

And truly first of al, The Patel Bone whenas it hath no obstacle on the sides hindering its dislocation, may be most easily luxated, to the upper, lower, outward, and inner part, but never to the hinder part, in regard that the bones of the greater Focil and Thigh which it covers do hinder it.

The Causes.

The Causes of this Luxation are, a fal from on high, jumping, blows, and an undecent distension of the Leg.

Signs Diagnostick.

The Luxation of the Patel Bone is easily known by the sight and touch, and the Thigh cannot rightly be bent and moved.

Prognosticks.

Whenas this Articulation is more loose, the Patel Bone may easily be restored to its seat.

The Cure.

That the Patel bone may be reduced into its seat, let the Patient stand firmly upright upon a place; but let the Chirurgeon with his hands force the Patel Bone from that part into which it is fallen, to that from whence it is fallen; when the Bone is restored to its place, fit Medicines must be laid upon it, and the hollow of the Knee must be filled up with Bolsters that the Thigh cannot be bent; then a hollow piece of the figure of the Patel Bone must be placed about it, especially on the side to which it fel, that the Patient may not bend his Knee. When there is no more danger lest the Patel Bone fal out again, let the Patient by degrees accustom to bend his Knee again.

Chap. 11. *Of the Knee Luxated.*

THe Knee may not only be Subluxated, but it may suffer a perfect Luxation; and truly oftentimes fals to the inward and outward part, seldom to the hinder part, but seldomest of al to the fore part, and not unless from a most violent cause, in regard that the opposition of the Patel Bone doth hinder it.

The Causes

This Luxation also happens from blows, fals, jumping, vehement running, and an uncomely extension or contraction, and distorsion of the Legg.

Signs Diagnostick.

To what part the Knee is Luxated is easily known; for in the side to which the joynt is broke forth a bunching out, but a Cavity in the side from which it is departed is discoverable both by the sight and touch: its figure is depraved, the Thigh is extended and cannot be bent, whence the motion is necessarily depraved, or wholly lost.

Prognosticks

1. The Knee if it be compared with the Elbow, the joynt in the Knee, by reason of its manner of juncture, oftener fals out, and is easier reduced. For the structure of the Bones with which both joynts are contained is more straight in the Elbow, more loose in the Knee; besides, many processes and many bosoms joyned to one another do every where bind up the joynting of the Elbow, but in the Knee the bunchings forth of the Thigh are cast into the smal Bosoms of the Leg.

2. For the same cause a Luxation of the knee is less dangerous, nor doth an Inflammation easily happen; for whenas an Inflammation ariseth from the force with which the bones are expelled and reduced again, and the pain arising from hence, because in the Knee the joynt may fal forth and

be reduced without any great force, there is no fear of an Inflammation.

The Cure.

The Knee luxated to the inward and outward part is not hard to be restored by moderate extension made, either with the hands in a new Luxation and childs body, or with rems in a Luxation not so late, and stronger bodies; and with forcing the bones with the hand into the contrary part from which they fel.

But a Luxation made backwards is commodiously restored, if the Patient be placed with his Face on a Bench, and some servant put a Linen Globe into the hollow of the Ham at what part the Bone sticks forth, and strongly force the bone fallen forth towards the fore parts; but let the Chirurgeon take hold of the lame Leg with both hands, and of a sudden so bend and bow it that his Heel touch his Buttocks.

A Knee Subluxated by none or very little extension made, and forcing it to the contrary part is reduced into its place.

When the Bone is reduced, which is known by the free extension of the Leg, and comparing it with the other Knee, convenient Medicines must be laid upon it, and binding up must be ordered, and the Patient must forbear going til there be no more fear of a new Luxation.

Chap. 12 *Of the Distraction of the Bracer.*

THe Bracer adheres to the greater Bone of the Leg, and as it was said in the former Chapter, above to the Knee, below the Ankle; but 'tis drawn from the great Bone three waies, to wit, To the fore part, and both sides.

The Causes.

But this Divulsion comes from those Causes from which we said the Knee was luxated, especially when walking in a slippery place the foot is not firm, but dubiously is wrinched inwardly or outwardly; the same may be by a fal from on high, or by a blow.

Signs Diagnostick.

A Tumor appears in the part to which the Bracer is distracted, and is discovered by the sight and touch; and motion is hurt.

The Prognostick

The reducing of the Bracer is easie.

The Cure

For by the hands of the Chirurgeon it may easily be compelled and brought back into its seat by forcing it into that part contrary to its fal: afterwards convenient binding up must be ordered, putting bolsters to that part to which the Bracer is fallen; and rest for some weeks must be commanded the Patient, til the Ligaments are confirmed again.

Chap. 13 *Of a Luxation of the Foot and its Bones, and of the Toes.*

BY the word *Foot* we understand al that part of Mans Body reaching out from the lower part of the Leg to the very ends of the Toes, which contains divers Bones after divers manners joynted together, and united by Membranous Ligaments, to wit, The Ankle, the Heel, the Ship-like Bone, the *Tarsus*, *Metatarsus*, and Bones of the Toes; of the Luxations of al which we should now speak; but because the Bones of the *Tarsus*, *Metatarsus*, and Toes, are here united almost after the same manner as the Bones of the Wrist, after-Wrist, and Fingers are to one another, they are subject also to the same Luxations, have the same causes, are known by the same signs, and are reduced the same way; but the ship-like bone may suffer the same things as the Bones of the *Tarsus*; it is not worth our labor to add much of these, but those things which are said of the bones of the Hand may also be applied to these. Some things only we shal add of the Luxation of the Ankle and Heel, whenas no Bones in the Hand do answer unto these.

Luxation of the Ankle and Heel

The Differences.

The Ankle joyned with the greater and lesser focil by a *Ginglymus* may be luxated perfectly and imperfectly to every part, to wit, The outward, inward, fore, and back part.

But the Heel lying under the Ankle is often moved indeed more forward and backward, but seldom to the sides.

The Causes.

The Luxation of these parts is from a violent fal, a blow, or some other inconvenient distorsion of the Foot. But in particular the Heel is luxated, and pulled from the Ankle, if one leaping from on high do fal and stick heavily upon the Heel, or in dancing doth insist much upon the Heel.

The Signs Diagnostick.

The Ankle if it be fallen to the outward part, the lower part of the Foot is turned inwardly; if to the inward part, there are contrary signs; if it be luxated to the fore part, the broad Tendon stretcht under the Heel is hard and retcht, and the Foot is less and shorter; if to the hinder part, on the contrary the Heel is almost hid, the Soal

seems

seems to become greater, and the Foot longer.

A Luxation of the Heel is easily known by the pain, the figure of the part depraved, and its action hurt.

Prognosticks.

1. The Ankle as 'tis easily luxated, so 'tis easily also reduced; but by reason of the multitude of Bones making up the joynts 'tis hardly confirmed.

2. A Luxation of the Heel is most dangerous, because the Veins, Arteries, and greater Nerves which it receives, and also the Tendon which is joyned to it, are easily drawn into consent; whence may be raised, Ravings, Tremblings, Convulsions, Feavers, and many other evils.

The Cure.

Let a Commodious extension go before the reducing of the Ankle; whether it be done by the hands of Servants, one of which must hold the Foot, the other the Legg; or with reins or other engines that draw downwards; afterwards let the Chirurgeon force the joynt to the contrary part from which it is fallen, and order a convenient binding up. The Patient in this Luxation must be kept longer in his bed, that the distended Muscles and the Ligaments which are rendered more loose may acquire their just strength, and may be fit to bear the whol body, which scarce happens before the fortieth day.

The Heel also upon light extension made is reduced to its ancient place; being reduced it must be so bound up that the humors abounding may be driven from it to other parts; the Patient also must be so long kept quiet, til this joynt restored be wel confirmed.

See more concerning Luxations in *Hippocrates* in *l. de artic. et fractur.* and *Galen* in his Comment. *Oribasius de machinamentis. Celsus l. 8. c. 11.* to the end of the Book. *Gabriel Fallopius, tract. de Luxation. Ambrose Parry, l. 15.* and others.

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IV. *Its Causes.*

V. *Its Differences.*

VI. *Several sorts of Signs thereof.*

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John Wilson taught this Cook

1705

2 hundred & 9 years Since the french pox

1705 first Cracked out among
1496 the french
020

1705
1660
045

OF THE FRENCH POX.

CHAP. I.

Of the Name and original of the Veneral Diſeaſe.

AMongſt contagious diſeaſes, next to the Peſtilence, and Leproſy of Arabians, the French Pox doth challenge the firſt place; but it is called by ſeveral names: the moſt common name is the French Pox, which was therefore impoſed, becauſe it firſt of al in Europe appeared amongſt the French. For in the yeare of our Lord 1493. and 1494. When *Charls* the Eighth, King of *France*, warred with King *Alphonſus* at *Naples*, this diſeaſe firſt appeared and began to rage in the Camps of the French, and therefore by the *Italians* was firſt of al named the French diſeaſe. For whereas *Antonius Benivenius de abdit. morb. cauſ. cap.* 1. relates that it happened in the year of our Lord 1496. that doubtleſs is thus to be underſtood, That now this diſeaſe did no longer contain it ſelf in *Italy*, but as he ſpeaks, had almoſt ſpread over al Europe, and began to diffuſe it ſelf abroad through the reſt of its provinces; for al other Authors agree in this, that this diſeaſe did firſt of al appeare at the foreſaid time in the French Camp at *Naples*, and there was called the French diſeaſe. But the French that they may remove this diſgrace from themſelves, and retort the injury upon the Italian, cal it the Italian, and Neapolitan diſeaſe, becauſe it was firſt known in *Italy* at *Naples*. Others becauſe it was brought by the Spaniards into the Fench Camp, cal it the Spaniſh diſeaſe, and others the Indian, for the writers of the Indies do report that in that part of *America*, whoſe longitude ends towards the North, and which they cal *Florida*, this diſeaſe many ages ago was epidemical; and they write that it did generally invade, and ſuddenly ſeize on many without any manifeſt cauſe, without contagion, and eſpecially if any one had copulation with a woman in the time of her Courſes. *Fracaſtorius* cals it Syphilis, ſome the gout of the privities, ſome the great Pox, becauſe puſtles and ſwellings do every where break forth like thoſe of the ſmal Pox. Moſt men now adays without any injury or diſgrace to any Nation, do cal it the Veneral diſeaſe, becauſe it is chiefly contracted by a contagion from Venery, and lying with unwholſome bodies.

The Names of the french diſeaſe.

The French Diſeaſe.

The Italian.

The Neapolitan.

The Spaniſh

The Indian.

Syphilis.

Pudendagra.

The great Pox.

The Veneral Diſeaſe.

But Authors are wont here to make this Quærie, Whether that diſeaſe ſprung up at *Naples* about the yeare 1494. were a new diſeaſe, or whether it were known to the Ancients? *Franciſcus Valleſius.* 1. *Epidem. com.* 1. And *Hieron Ruſnerus de Scorbuto exercit.* 1. and the ſome other moderns, are of opinion this diſeaſe was unknown to the ancients, and they think that *Hippocrates* did not ſhadow it

Whether it be a new Diſeaſe.

out

out by his pencil, but set it forth to the life in 3 Epid. Sect. 3. (they are the words of *Reusner*) whenas he reckons up there divers symptomes, which are seen in the veneral disease; as imposthumations and suppurations of the flesh, the lying bare of the nerves and bones, and great fallings forth, fluxions collected not like unto matter, but far worse, a baldness of the head and chin, with and without a Feaver, St. Anthonies fire with smal Ulcers and inflamation, filthy and putrid fluxes, pains of the limbs, swellings about the jaws, inflamations of the tongue, impostumations, about the teeth, stammering, corrupt, and perplext speech, enterings into consumptions, burning Feavers, and which is worst of al, ulcers about the pubes and privities.

But *Hippocrates* in that place never so much as dream'd of the Veneral disease, but describes a most grievous pestilence, according to the judgment of *Galen* and al interpreters, and the evidence of the History it self witnessing the same. For that disease for the most part invaded with a Feaver, which is not so in the Veneral disease and was epidemical, whenas the Veneral disease is disseminated only by contagion, and no other way, and the method of curing that disease was far different from the cure of the veneral.

Dodoneus also hath observ'd upon the alleaged place of *Benivenius*, that a long time agoe some men have contracted some hurts from uncleane and filthy women, as *Guilielmus Salicetus*, *Gordonius*, and *Vallescus de Taranta*, do testify, the last of which lived in the year 1418. but *Salicetus* flourisht in the yeare 1270. *Gordonius* in the time between them both. Nay holy writ doth testefy that he that followeth harlots, shal have wormes and moths for his reward: but I do not think that those diseases were the same with the Veneral disease of this time which first of al appeared at the aforesaid time in *Italy* in the Camp of the French. Therefore though *Paracelsus*, *lib. de tumorib. et ulcer. morb. Gal. cap.* 3. Writes that this hapned in the yeare 1478. and *lib.* 1. *de causa luis Gal. cap.* 3. In the yeare 1480. yet he differs from the relations of al others, since al agree in this, that this disease was not known in Europe, before the yeare of our Lord 1493. although it were endemious in the west *Indies* a long while before, and was brought by the Spaniards out of *India* into *Italy*. For when *Christopher Columbus* in the yeare 1492. in the month of *September* undertook his first voyage into the west Indies, and spent almost two years in that expedition, he returned into *Spain* in the yeare 1494. whose Souldiers being infected with that disease in *India*, and afterwards serving in the *Italian* expedition, did sow amongst them this disease. For as *Gabriel Fallopius* writes of this business *de morb. Gal. lib.* 1. (Who reports his Father was in that warre) whenas the Spaniards by reason of the dearenes of provisin did drive out the unserviceable multitude, the French did privately entertain their harlots, being allured by their beauty, and so infected with their contagion contracted this disease, which afterwards was first of al spred through their camps, & hence throughout Europe.

The Original of the Veneral disease.

Yet in some Countries it hath and doth yet spred more frequently, in others 'tis more rare, to enquire into the cause whereof, it being a thing hateful we shal forbeare; yet this I think is certain, that there are fewer sick of this disease in *Germany*, than in some other Countries. *Gabriel Fallopius* makes mention *de morb. Gal. cap.* 76. Of *Jacob Carpus*, who was the first almost that used the way of cure by unction of Quicksilver, who by this cure alone grew so rich, that he left besides Silver, 40000. Golden * Scutatoes. And *Capivaccius* reports in *tract at: de lue Vener. cap.* 12. In fine, that he hath gotten by the cure of the French Pox only above 18000 Crowns of Gold. And *L. Septal. l.* 7. *animad: n.* 186. writes that at *Millaine* in *Brolius Hospital*, there is oftentimes cured seventy in the spring only, and at other seasons alwaies two hundred. But I confes ingeniously, that within these 34 yeares which I have practised at *Witeberge*, and by Gods blessing I do it not without profit, that I have not gained by the cure of this disease so many crowns,

* *A Coin.*

Crownes, as *Capivaccius* hath got thousands of them, by reason of the fewnes of them that are sick of this disease in this place.

Yet others differ concerning its original, and think that this disease was not only disseminated by contagion from the Spaniards, but think it was contracted by the fault of the Ayr, as epidemick diseases are; when as many every where in diverse countries began to be sick of this disease without any contagion; of which hereafter.

Chap. II.

A History of the Veneral Disease.

BUt concerning the original of this disease we shal speak more hereafter when we shal treat of its causes: now let us enquire into its nature, which that it may succeed more happily, and that it may appeare, where lyes the controversy, I wil first propound its description and history out of creditable Authors which then lived especially *Hieron Fracastorius*, and *Anton. Benivenius*. When this disease was first made known, there rose pustles of divers kinds in the genital parts, sometimes also the head, principally in the hairy part, sometimes also the forehead, neck, breast, duggs, armes, and other parts, and from thence did spred over the whol body, in some indeed they were flat and low, but rough on their surface, when the scales were fallen off, of a color somwhat red, and the flesh under them appeared callous; in others they were like to warts, of a round figure, which grew to the magnitude of an acorn cuppe whose figure also they resembled, and from these the lighter scales falling off did hang forth a more ruddy flesh, from wch did flow forth a virulent ichor and of a strong smel; but some were taken with larger pustles, which did not swel above the skin, which had thicker scales, from which also did flow a more plentiful virulent matter, and the scales being cast, the flesh appeared more dark and somwhat livid. Some having white scales taken off, there remained somwhat like unto a skar, from which blood sometimes flowing, did shew the difficulty of the cure, and it represented the likenes of a dry scabb, a disease worse than al the rest. For though it did corrode less, yet for spreading it was worse than the rest, and was diffused into divers places. Besides those external pustles there did rise others in internal places, as in the mouth, jawes, nose, and the obscene parts, which turned to malignant and creeping ulcers which eat away the parts under them, and in some eat up the Nose, in others the lipps, in others consumed the Uvula, and perforated the palate, which caused their voice to be hoarse; neither did this evil spare the bones, but caused rottennes in them, whence some had their skul, others other bones ful of holes. Neither did those pustles and signs of the disease appear only in the external parts obvious to the eye, but it was observed in some, that those pustles & filthy ulcers had possest their very bowels. They that had this evil about their upper parts, had vitious distillations, which did sometimes eat their palate, sometimes the jaws and tonsills, in some their nose, and in others their eyes. Furthermore for the most part certain gummosities grew on their limbs in great deformity. For oftentimes they were prominent the bigness of an egg, oftentimes the size of a Loafe, which being opened, there appeared a white mucilaginous mucous: that tenacious callus, happened most of al in the Arms and Thighs, in some it was exulcerated, sometimes it continued whole until their death. There came also cruel pains with exceeding torment, which were exasperated towards night: but those pains did shew themselves about that part of the bones where is no flesh in the Leggs, shoulder-blade, about the collar-bone, in the shoulders, head, about the forehead and temples, sometimes also in the breast bone, but not in the very joints, but about the muscles and nerves. In which case notwithstanding there was great variety. For some had pains without pustles, some pustles without pain, the greatest part was affected with both, and truly those pains sometimes went before the pustles,

somtimes followed, and sometimes rose together with them: in the interim al parts languished, the body pined away, the appetite was dejected, watchings, sadness, and continual anger, and desire of repose possest them; sometimes a smal Feavor accompanied them, but seldome: their blood, if a Vein were opened, was mucous, and corrupt, their urine thick, fat, and somwhat red without a Feavor, they went hardly to stool, and the excrements were mucous and dry. The shedding of the Hair is frequent in this Disease, especially in the Head, about the Temples, and the hinder part, also of the eybrows, and of the Beard in men; oftentimes also Buboes break forth in the groin, therefore called Veneral and Gallical, which sometimes vanish again, somtimes grow hard, somtimes suppurate; there rise also in the privities of Women knobs, and in men in their Arse-hole, besides somtimes there happen chops and clefts in the hands and feet, and the thick Skin in the palme of the hands departs from the skin under it; sometimes also the nails fal off: At last there happens sometimes, that in men a virulent matter flowes through their yard, in women through their privities, which flux of virulent matter is commonly called the Gallical or virulent running of the reins, although indeed it is not seed, by which flux of the yard, the inward passage is exulcerated, and certain caruncles do grow in the urinary passage, whence they pisse hor, and there is caused a dropping of the urine with pain. And this was the face of that disease at its first rise, wch as *Hieron Fracastorius* relates, since that time seems to be altered. For almost twenty yeares after its original there began to appear fewer pustles, but more gumosities, and the pustles became dryer, and the paines more cruel. Six yeares after again there was another change, for now there were very few pustles seen, and almost no pains, or much gentler, but many gumosities, and which seemed wonderful in al, the shedding of the haire made men almost ridiculous, some appearing without beard, some without hair on their eyebrowes, others with bald pates, from which change *Fracastorius* had good hopes, and did think that the old age of this disease was now entring, and that ere long it would come to pass, that it could not propigate it self by contagion, because the matter grew dayly thicker, in which both fewer, and weaker seminaries are produced: but his hopes did much deceive him, and this disease last even in these times, nay as some think, 'tis wel nigh worse than it was of old.

CHAP. III.

Of the Nature of the Veneral Disease.

The Veneral diseas, is from an occult quality.

SInce then so great a Hodge-podge of diseases and Symptoms appear in this affect, we must diligently enquire what the nature of it is, of which divers Authors have their divers opinions, and as *Epiphanius Ferdinandus* writes of this business, in *Hist. Med. Hist.* 17. the Authors which have writ of this Disease, although they amount to the number of eighty (and perhaps more) are al almost differing concerning the Essence of this Disease, and every one defines it at his own pleasure; for whenas this Disease was unknown to the Ancients, nor described by them, nor they had not, as is usually wont to be, the opinions of the Ancients to insist upon, every Modern using his own liberty hath propoled his own Opinion. Truly I think this is not doubted, that 'tis a Contagious, Malignant and Venenate Affect; neither doth it seem to want any great pains to prove it, for it appears sufficiently by this, that in so smal a quantity of matter, by which this Disease is contracted by contagion, there is so great force and power of action, as no first quality, or the temperament made up of the first qualities can have; and the variety of Diseases and Symptomes in this evill is so great, that it cannot be reduced to any manifest cause; therefore as in pestilent constitutions, such as that Attick one was in *Thucidides*, and that which *Hippocrates* hath described, 3. *Epid.* there was so great a multitude of evils, that they were forced to fly to occult qualities and a venenate cause; so also, there being so great a filth of diseases and symptomes in the Venerous Disease,

Diſeaſe, that the original of them all cannot be refer'd to any manifeſt quality, here alſo we fly to a malignant and occult quality.

But although theſe things be thus, yet Authors differ ſtil of this, whether that malignity conſiſt only in the cauſe, or whether there be alſo ſome malignant Diſeaſe preſent. *Capivaccius, de Morb. Gal. Cap.* 1. thinks this affect not to be the Diſeaſe, but the cauſe, while he defines the Veneral Diſeaſe, that it is an excrement wholly preternatural, able to hurt man many waies, produced out of humane ſubſtance by its like. *What it is.* *Capivaccius opinion*

Thus alſo *Hercules Saxonia, de lue Vener. Cap.* 1. writes, that the Veneral Diſeaſe is the Cauſe, not the Diſeaſe nor the Symptome, therefore, becauſe it can exiſt out of mans body in Linnen, or other ſuch kind of vertues, beſides in the ſweat, Seed, and Blood, being ſeperated from the body; but within mans Body it infects and poſſeſſes alſo thoſe parts which are not living, and are not ſubject to Diſeaſes, viz. the humors and ſpirits. *Hercules Saxony.*

Aurelius Minadous de virulentia Vener. holds that 'tis neither the diſeaſe, nor the cauſe, nor the ſymptom; not the diſeaſe for this cauſe *cap.* 17. becauſe 'tis neither a diſtemper, nor evil Compoſition, nor a ſolution of unity: but he denies it to be the cauſe of the Diſeaſe, *Cap.* 9. ſince that is properly the preternatural, the cauſe between which and the Action there fals a medium, viz. the diſeaſe whenas the diſeaſe is that which doth next of al hurt the Action, but the cauſe doth hurt it by intervention of the Diſeaſe; but between the Veneral virulency and the action hurt he thinks there fals no medium, but that of it ſelf by its own ſtrength doth primarily and immediately vitiate and hurt the operations; but that the Veneral virulency doth of it ſelf and primarily hurt the operations, he thinks this is confeſt amongſt Phyſitians, and therefore deems it to be preſuppoſed, and unleſs this virulency did of it ſelf and primarily hurt the operations, ſo many Phyſitians would not have labored in ſearching out its nature. He proves it is no Symptome, *Cap.* 18. beauſe it is no action hurt, nor quality changed, nor excrement altered. That it is no action hurt, he proves by this, becauſe the veneral virulency it ſelf is that which hurts the actions; neither is it any quality changed, becauſe the qualities changed do follow the actions hurt, and beſides ſo many diſeaſes are ſeen in this virulency which are not Symptomes. But *Aurelius Minadous* himſelf, when he had rejected al the opinions & definitions of others, at length he fits himſelf to make a perfect definition and to explain the nature of this evil. But firſt of al Chap. 16. he preſuppoſes this as the ground of his opinion, viz. that the French Diſeaſe ought not to be defined by a quality, but rather by the name of a body, for this reaſon, becauſe it paſſeth from one body to another, which is the propriety of bodies not of qualities, and becauſe it toucheth other bodies, for none but bodies can touch, and be touche again, as *Lucretius* hath it. Again, if it were a quality, it were either manifeſt, or occult, no manifeſt one, as he proves rightly by many Arguments; but that it is no occult quality he brings no ſpecial Argument, but repeats the general one, becauſe 'tis moved from place to place, and toucheth other bodies. *Aurelius Minadous.*

This preſuppoſed, afterwards Chap. 30. he affirmes the Veneral virulency to be ſomwhat corporeal internal, and truly a ſpirit or a vapor, for this reaſon, becauſe 'tis carried, commuicated, and participated in a very ſhort ſpace of time. Yet he holds it to be ſuch a vapor which is endewed with an occult quality and vertue from its whol ſubſtance, or the whol mode of its nature, by reaſon of which quality it cannot only infect any humors of the body, but alſo al parts of the body, and corrupt them & turn them to its own likeneſs: but that this evil conſiſts in a ſpiritual ſubſtance, he further proves, becauſe ſome are infected not only by the act of Venery, but alſo by a Kiſs, or the uſe of garments: next of al, becauſe ſome have felt no other hurt from this evil, than only the falling of their hair, becauſe the roots of the hairs were gnawed off by the acrid vapors. Thirdly, becauſe ſome only by vehement exerciſe have diſcuſſed this virulency. Yet he denies that vapor or ſpirit to be properly an excrement, Chap. 20. whenas that is properly an excrement, which redounds from nouriſhment, & which is caſt off from another: although he grants there

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that is commonly called an excrement, whatsoever is superfluous in the body, whether it be a spirit, or humor, or some other solid body, whether it be usual, or unusual, whether according to nature or preternatural; furthermore he holds this vapor to be wandring, thin, and viscid, Chap. 21. and to be raised from a spirituous, humorous, solid substance: but he proves Chap. 22. by many Arguments that this vapor is contrary and preternatural by its whole substance, of which we shal speak hereafter; and at last Chap. 27. he defines the Veneral virulency, that it is a vapor by its whol substance inimicous to the natural faculty, working by degrees. And that he might unfold his mind more clearly, and not leave the Reader doubtful, to what kind of things preternatural this virulency ought to be referred, whenas he had said before, that it was neither the Disease, nor the cause, nor the Symptome, yet it primarily hurt the actions; at length Chap. 28. he holds that 'tis an externall error, and he endeavors to prove it by this Sylogisme, whatsoever doth primarily hurt the operation, and is not of the constitution of the body, is an external error, but the Veneral virulency doth primarily hurt the operation, and is not of the constitution of the body, therefore 'tis an external error.

Some that they may briefly quit themselves, and hold with al men, say that this disease is a heap of al evils, Diseases and symptomes.

The Veneral disease depends on an occult quality.

That we may clear our selves out of this difficult controversy, first of al 'tis already proved, and shal be proved more at large hereafter, that they are in the right, who do here admit of an occult quality, and a power depending on the whole substance, as they commonly speak; neither can they hold any other waies, Since 'tis without doubt, that 'tis a contagious and malignant disease while it is such. It performes two things, to wit, it alters the body by which it is received and changeth it to its owne similitude, and indeed it alters it not by the first qualities: as shal be said by and by, since it is not expeld by the first qualities; neither is that change alwaies with putrefaction, whenas putrefaction is not induced but by a long time, but this change is made in a moment as it were; neither is it an aduction as *John Baptista Montanus*, and some others do hold, whenas there is not alwaies a hot & dry distemper present, neither is it cured by cooling and moistening things, and oftentimes there is a sordid putrefaction, in which there is no exuction.

'Tis a disease.

But whereas they hold this malignity is only in that matter seated without the living parts, and that there is no such disease present, in this they erre very much. Indeed we willingly grant, that that contagious inquination, sent forth from the body infected with the veneral disease, may adhere to the garments; neither do we deny this, that the humors in our body may be tainted with the same, yet in the interim it doth scarce follow, that the living parts remain free and sound; for as in a putrid feaver, though the humors and spirits do first grow hot by the feaverish heat, yet afterwards the living parts are seized on by the same distemper, so though the humors in the Veneral disease are first infected by that occult malignity, yet there is no cause why the same fault may not be communicated to the living parts.

Not hot and dry.

But though some do acknowledg that this cause cannot be idle, yet whenas they know nothing beyond the manifest and first qualities, they endeavour to reduce also the effects of the veneral virulency to manifest causes. *John Baptista Montanus* as was said even now, thinks the essence of this evil consists in a hot and dry distemper, but the cure tels otherwise, whenas 'tis cured by hot and dry Medicines, as by the Decoction of Guajacum and the like: besides, because there is a great putrefaction in the Humors, which doth not proceed from a hot and dry distemper.

Not cold and dry.

Nicolaus Massa de Morb. Galli. Cap. 5. saith it is a coldnes of the Liver, declining to a little drines with an occult quality: but as concerning the occult quality he writes truly, but that it is no cold distemper, the effect doth teach us, as the Ulcers, rottennes of the bones, and the like; and what other distemper soever they alleage. Yet they produce nothing agreeable to the Diseases and

Symptomes,

Symptomes, which appear in this Diſeaſe, nor to the Cure.

Therefore when as the action of the veneral virulency can be referred to no manifeſt quality. We may wel ſay that by that is induced an occult quality: For firſt of al every efficient cauſe is ſaid to be a cauſe from the nature of its efficiency, and therefore this malignant quality doth not only alter and change the humors, but alſo the living parts into its likeneſs: again, though the morbifick cauſe be taken away, and this diſeaſe ſeem now to be overcome, yet unleſs that malignant diſpoſition be deſtroyed the man recovers not his perfect health. For it hath been obſerved that the Veneral Diſeaſe hath ſomtimes grown freſh after thirty years paſt, which doubtleſs happened not becauſe the Vitious Humors lay ſo long hid in the body (for theſe would have ſooner diſcovered themſelves by their ſigns) but becauſe that malignant diſpoſition impreſt on the body was actually there, which afterwards, by degrees produced vitious humors, and corrupted, and ſo broke forth into act; and *Trincavellius*, *Lib.* 11. *de curand. rat. particul. affect. cap.* 11. reports, that a certain Woman brought forth a Child ſick of the French Diſeaſe, and every where ful of cruſty Ulcers, whenas ſhe her ſelf never had any ſign of that Diſeaſe contracted, but was alwaies wholly wel, and on the contrary it may happen, that one may have a French Ulcer, which yet, when that Malignity is diſtroyed, is no longer rightly ſaid to be Gallical, but is cured by vulgar Medicines as other Ulcers. *But occult.*

Al which being thus, we conceive the the Veneral Diſeaſe, doth not only exiſt in the Humors, but alſo in the living parts, and that it doth conſiſt not only in the change of the firſt qualities, but alſo there is an occult malignant quality imprinted on the parts, and therefore the veneral Diſeaſe is to be referred to diſeaſes, and thoſe of occult qualities. Which are called by *Fernelius* diſeaſes of the whol ſubſtance, but not on every part rightly explained, as we have ſaid before, the which if *Capivaccius*, and *Saxonia* had known, the one would not have defined this evil by the excrement, nor the other by the cauſe. if the ſame alſo had been known to *Aurelius Minadous*, he would not have endeavoured to maintain that this evil was no Diſeaſe, but an external error. For whereas he endeavors to prove that the veneral Diſeaſe is not a Diſeaſe of the ſimilar parts, becauſe it is not a diſtemper, nor an evil compoſition, nor a ſolution of unity, in this proof he labors to no purpoſe, for al this we willingly grant; but this he ought to prove, that there is no other kind of Diſeaſe in the ſimilar parts beſides the diſtemper of the firſt qualities; but that there are ſuch diſeaſes, which *Fernelius* calls of the whol ſubſtance, we more rightly, of occult qualities, is ſufficiently proved above, *part* 1. and this very Diſeaſe, as all other venenate Diſeaſes do ſhew, that it can be referred to no other kind than to malignant qualities; & this follows from *Minadous* his own ſuppoſition, and confeſſion, which he hath *Cap.* 20. where he writes, that the Veneral virulency hath power not only to infect al Humors, but al parts of the body, and to corrupt and convert them to its own ſimilitude. The ſame *Minadous* if he had known theſe Diſeaſes, had not taken ſo much pains, to what kind of preternatural things the veneral virulency ought to be referred. For firſt of al there was no need of excluding from the number of cauſes, thoſe vitious Humors, which are found in the bodies ſick of the veneral Diſeaſe, and have power to alter and change the Humors themſelves and parts of the body. For whereas he ſaith, that is properly the cauſe, between which and the action hurt the diſeaſe doth interceed, that is true of the next cauſe, but the antecedent cauſes alſo may do hurt, as they have the Nature of a vitious object, and external Error: and in this very Diſeaſe whiles the virulent Humors do imprint a malignant quality on he parts, between them and the action hurt that Malignant diſpoſition and occult quality doth intercede. Therefore whereas he thinks that Humor or venenate vapour in the veneral diſeaſe, doth imediately hurt the action, 'tis falſe, unleſs that humor have the nature of an external error. For al hurt actions in the Veneral diſeaſe do happen, whiles between them and the humor, or malignant *An examination of Aurelius Minadous opinion.*

vapor,

vapor, a midling diſeaſe doth intercede, to wit, that of occult qualities.

The Veneral diſeaſe is not a Body.

But whereas he denies the Veneral virulency to be a quality, and holds it to be a body, firſt of al he confounds the cauſe and the diſeaſe, next of al he doth not diſtinguiſh between the quality and its ſubject. For whiles we ſay the Veneral evil, we underſtand either the diſeaſe it ſelf, or its cauſe: if the diſeaſe, that is a quality, as al diſeaſes are, to wit a preternatural diſpoſition of the parts, and indeed an occult and malignant quality: but if the veneral evil be taken for the cauſe, either wch without, being communicated doth induce this diſeaſe; or which is in the body, which raiſeth divers diſeaſes and ſymptomes, and can infect others, we grant that cauſe may be called a body. But we muſt take notice, that thoſe humors or vapors are not ſaid to be cauſes, as they are bodies, but as they have an occult and malignant quality, which *Minadous* himſelf cannot deny, while *Cap.* 20. he writes, That that vapor or ſpirit, which he cals the veneral virulency, is endewed with an occult quality and vertue, depending on its whole ſubſtance, by which it is able not only to infect any humors of the body, but al its parts, and to corrupt and convert them to its own ſimilitude. For what ſimilitude is that I pray, to which the Veneral virulency converts not only the humors, but alſo the parts of the body, unleſs it be that occult quality with which that vapor is endewed?

Whereas laſt of al, *Cap.* 38. he refers the Veneral virulency to external error, becauſe it primarily hurts the operation, and is not of the conſtitution of the body. But before denied it to be either the diſeaſe, or cauſe of the diſeaſe, or ſymptome, in vain doth he multiply things, preternatural; for there are not more preternatural things, than the diſeaſe, cauſe, and ſymptome; and the Veneral virulency, as he deſcribes it, doth wholy belong to the cauſes two manner of waies, for either it induceth the like diſpoſition into the parts of the body, or it raiſeth other diſeaſes while it eats and exulcerates the parts. But whenas he ſaith the Veneral diſeaſe taken for the cauſe, is a vapor or a ſpirit, that is rightly to be underſtood; for indeed it can no way be denied, that it is a humor alſo, whenas in copulation 'tis rubbed againſt the body, and ſticks in the cloaths: yet ſuch is its nature, as 'tis alſo of other contagious humors, that though it be reſolved into vapors and the leaſt bodies, yet every one of them contains its whole eſſence, and hath power to affect others: and this thing may be declared by muſk, caſtor, and the like. For thoſe things, though they be bodies, and humorous too, yet are ſuch, that though they be reſolved into the leaſt bodies, nevertheleſs they retain their ful ſtrength. After the ſame manner it is in the Veneral diſeaſe, and other contagious diſeaſes, in which though the malignant and contagious humor, be reſolved into the leaſt bodies, yet every one of them obtaines the ſame eſſence, and vertue, and power to infect others.

Whether it be a Vapor or a ſpirit.

But whereas he thinks that humor and vapor is not to be called the cauſe, but an external error, in that alſo he is miſtaken: for an external error belongs unto the cauſes, from whence the Symptomes ariſing from an external error, are called the ſymptomes of the cauſe; where this alſo is to be obſerved, that Phyſitians do not vouchſafe the name of the cauſe to the next cauſe only, but alſo to the antecedent, which do not yet effect the diſeaſe: therefore there is bad nouriſhment by reaſon of vitious humors, although they have not yet imprinted a diſtemper, and vitious diſpoſition on the parts: but whereas he denies the Veneral virulency, conſidered as a vapor to be the cauſe, becauſe it hurts the actions not by the mediation of a diſeaſe, but next of al, and imediately, he preſuppoſeth that which is not yet granted, and ſo begs the queſtion: for this ſpirit or vapor hurts the very conſtitution of the ſimilar part, and imprinteth on it a malignant quality; the which he himſelf cannot deny, whiles *Cap.* 23. he holds, that by this diſeaſe of venery many actions are hurt, but not al in al people; but the hurt of the natural faculty is common to al, and that there is none, that is poſſeſt with this diſeaſe who is not troubled with ſome fault in his natural actions, and hence proceeds al that filth of excrements, and the gummoſities ariſing from thence, tumors, puſtles,

by

pains, running of the reins, ulcers, rottenneſs, and ſuch like evils; and that the Veneral virulency hath a peculiar enmity, and diſcord with the natural faculty, and is inimicous to it by its whol kind, that is, by its form, by its ſpecifick faculty, by its whole ſubſtance, and occult propriety: but he further deſcribes the enmity againſt the natural faculty, that it is by its nature deſtructive to the natural ſpirit, that the Veneral virulency hath unſpeakable qualities, hindering the generation of the natural ſpirits, and thoſe not manifeſt, but occult. But whenas there is required to a natural action, the ſoul, the temperament, and the innate heat, or the implanted ſpirit, and the influent heat, he further concludes rightly, that the ſoul is not hurt, as that which can no waies ſuffer, nor the manifeſt temperament, as was proved hitherto, but chiefly the implanted ſpirit or the innate heat: al which whenas they are ſo rightly ſpoke, and the Veneral viruleney is an enemy to the implanted ſpirit, and truely not by manifeſt qualities, but by its form, by its ſpecifick faculty, by an occult propriety, by which it indeavours to change not only the humors, but alſo the living parts, and the implanted heat in them into its own ſimilitude, certainly the like malignant quality, is induced into the parts: which vitious & malignant quality, what other thing I pray is it, than an occult & malignant diſeaſe?

The Veneral evil is an occult & venenate Diſeaſe.

Al which being thus, we rightly conclude, the Veneral evil is an occult and venenate diſeaſe; for it is induced by cauſes of that kind, and immediately exerciſeth ſuch effects which cannot be referred to any manifeſt diſtemper, but onely to an occult quality; neither is it cured by medicines that work by manifeſt qualities, & correct known diſtempers, but by proper and ſpecificks, which al Phyſitians at this day, and eſpecially thoſe who lived at the beginning of this diſeaſe have teſtified, and to their own and patients damage have found it true. For when they followed the common way of cure, and could do no good for the cure of this diſeaſe, they began to be deſpiſed by many, til the Spaniſh Phyſitians ſhewed them medicaments brought out of the *Indies*, and bold Chyrurgeons ventered upon Quick-Silver.

What is the ſubject of the Veneral Diſeaſe.

But that al this may be made clearer, we muſt enquire what is the ſubject to this diſeaſe, concerning which phyſitians do differ. Some have thought the privities are firſt infected: for by theſe parts for the moſt part, this evil is contracted by impure copulation, and the footſteps of this diſeaſe, unleſs it be perfectly cured, do chiefly appear about the privities; the nut is eaſily excoriated in venery, the fleſh oftentimes remaines callous for a long time, with a running of the reines, and breaking forth of buboes in the groin. But though it cannot be denied, that oftentimes the original of this evil is from the privities, and doth chiefly diſcover it ſelf in that place. Yet that doth not happen alwaies, but the ſame diſeaſe may be contracted by kiſſing, ſweat, embraces, veſtures, nay infants alſo may be infected by the milk they ſuck from their nurſe, & they that are infected after this manner, have not this diſeaſe appearing in their privities.

Not the Privetie.

Some, as *Leonicenus* do hold, ſay that the skin is the ſubject of this evil, as in the ſcab, tetter, and the like affects: but the skin alone is not alwaies affected, but other parts alſo, the privities, the jawes, the bones which become rotten, nay ſometimes alſo the internal parts. *Hercules Saxonia de lue Vener. Cap.* 3. maintains a threefold ſubject; one in the beginning; another in the middle; another in the diſeaſe confirmed: in the beginning he holds that the natural ſpirit is affected or the vaporous part of the maſs of blood, then the juyces and excrementitious humors, at laſt the alimentary humors, but in proceſs of the diſeaſe, aduſt humors; and the parts affected are the ſtomach & liver, & thence chylification & ſanguification are hurt; but when the evil is old, flegmatick humors are the ſubject of it, & the parts affected are ſimelar, bones, nerves, membranous bodies: but we willingly grant, that as the diſeaſe is new, or old, ſo and alſo ſometimes more, ſometimes fewer parts are poſſeſt and corrupted; as we deny not this neither, that the excrementitious humors are eaſier corrupted than the alimentary, whenas nature doth alwaies more defend the profitable humors, than the excrementitious, into which without any difference this evil doth eaſily almoſt diffuſe it ſelf, but indeed the queſtion is not here, what may be infected by that virulency; but this is the Querie, what is the ſubject of this diſeaſe, which we have

Not the skin.

demonſtrated to be; for as in putrid feavers the ſpirits and humors wax hot, yet are not the ſubject of the feaver; ſo alſo though a malignant quality from the Veneral virulency be imprinted on the humors; yet they are not the ſubject of the diſeaſe, but only the living parts, and which of them is the ſubject of this diſeaſe is the queſtion: and whiles that he ſomtimes holds the Liver and ſtomach, ſometimes the ſimilar parts to be the ſubject of this diſeaſe, in that he is wavering, for whether the diſeaſe be new or old, the ſubject is the ſame.

Not the ſpermatical parts.

There were ſome others alſo, who held thoſe parts we cal ſpermatical, the nervous and membranous, were the ſubject of this diſeaſe; but not only the membranous and nervous parts, but alſo the fleſhy parts are affected in this diſeaſe.

Whether the liver.

Others hold the Liver to be the chiefe ſubject of this diſeaſe, and this opinion is moſt conſonant to truth, but when as many other parts are affected, 'tis conveniently to be explained, as ſhal be ſaid by and by.

Whether al the parts.

Aurelius Minadous de virul. Vener. Cap. 34. firſt of al preſuppoſeth this, that there is no peculiar member in our body, which is alwaies affected in the Veneral virulency, which is true in its way, whiles ſomtimes this, ſomtimes that part is affected; next of al he holds that this viulency is chiefly an adverſary to the natural actions, or rather to their faculties, which natural power when as it is in al parts the veneral virulency is not an enemy to one part in ſpeice, but to al, in which that power is. In the third place he adds this, That that natural vertue implanted in the natural parts, doth performe its operations without any influx, and that there is no natural faculty influent, as there is an animal influent; ſecondly he confutes them in particular, who hold the Liver to be the firſt and perpetual ſubject of this diſeaſe, for it may come to paſs ſaith he that one after an impure copulation may preſently ſuffer an exulceration in his privities, whom certainly no body wil deny to be infected with the Veneral diſeaſe, whenas yet in him the Liver is not affected: and the ſame reaſon is for other parts, which are firſt affected by contagion; nay he holds, that one external part being infected, the humors in the body may be infected without any hurt of the Liver. In the interim he cannot deny this, that this evil doth moſt properly and chiefly appear, when the Liver is affected, when as the operations of the Liver are neceſſary to the whol body. The ſame Author *Cap.* 4. endeavors to prove, that the Liver is not the ſubject of the Veneral diſeaſe, whenas the face ſaith he is the index and trueſt glaſs of the internal affects of the body, yet eſpecially the affects of the Liver doe appear in it; therefore if the Liver were perpetually affected in the Veneral diſeaſe, alſo the color of the face ſhould alwaies appeare vitious, the which we have found falſe by experience; for we have ſeen both men and women infected with this diſeaſe, who notwithſtanding have had a freſh color in their face, and the evil hath been in their privities: again he thinks, that by carnal copulation the privites may firſt of al be affected, and from thence the evil may creep through the veins, and by the ſpirits, to the other parts of the body, and as one part is more apt and diſpoſed than another to receive the infection, ſo ſomtimes this, ſomtimes that is infected, but not alwaies the Liver.

The Authors opinion.

That we may cleare our ſelves of this controverſy, firſt of al we muſt enquire from the actions hurt what part is affected, and what faculty is oppreſt; but though divers actions hurt that part in the veneral diſeaſe, yet al of them cannot bring us to the knowledg of the firſt and proper ſubject. It happens indeed ſomtimes, that there are pains felt in the head about the muſcles and bones, but that is not alwaies. Somtimes alſo the hurt happens in the external and internal ſences, but this alſo is ſeldom: ſomtimes putrid vapors are inflamed, and hence a Feaver is raiſed, which ſome cal a French Feaver, but this alſo happens ſeldom. In like manner 'tis in other diſeaſes and ſymptomes. One action is hurt which is common to al that are ſick of the veneral diſeaſe, viz. nutrition is corrupted; hence we ſee that in thoſe who are poſſeſt with this diſeaſe, the color of their body is changed and ſulled, and ſometimes turns black, ſomtimes of a lead color, ſomtimes livid. There ariſe every where in their body divers kinds of ſwellings and bunchings out, alſo ulcers, the bones rotten, the hairs fal off, al which proceed from corrupt nutrition. From which we conclude that

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the veneral disease is primarily an enemy to the natural faculty: but 'tis no wonder that this poyson is only an enemy to the natural faculty, whenas there are other poysons, which are inimicous to other faculties: thus the poyson of the pestilence and many others are enemies to the heart, cantharides to the bladder, mad night-shade and opium to the animal faculty. *The Veneral disease is an enemy to the natural faculty.*

Whence that we may briefly conclude the business, this evil indeed may be contracted by one member, yet if it be spread into more from that one, that comes to pass because the Liver is infected: yet because this poyson hath principally an enmity with the natural faculty, and the fountaine of that, or chiefe seat is the Liver, that also is primarily infected with this virulency, and through that the rest of the parts contract this evil. Therefore whereas *Minadous* objecteth, the color of the face is sometimes fresh, therefore the evil is not yet communicated to the Liver, but stil sticks in the privities which were first of al infected, and the force of this virulence is sometimes greater, sometimes less; from whence also 'tis sometimes sooner, sometimes later communicated to the Liver. Besides, this evil consists not in the first qualities, but in occult, whence 'tis no wonder, that that malignity may consist in the blood, which to the appearance is good; but al those things wil be yet made clearer by the discovery of the causes.

Chap. IV.

Of the Causes.

BUt concerning the causes of this disease, two things are to be explained, the first is how at this day the Veneral disease is contracted; the other is, what was its original when it first appeared. At this day indeed I think this evil is no otherwise contracted, than by contagion, and that 'tis manifest that every Veneral pox is not contagious *Hercules Saxonia, lib. de lue Vener. cap.* 3. Holds that every Veneral pox is not contagious, and that which is old and confirmed is for the most part less contagious, than that which is new, and of a middle age, and that which discovers it self by knobs, is not contagious; and he endeavors to prove it, first of al by reason; because the contagion is placed in a hot and movable excrement, but when nothing breaths forth from the part affected, which can be communicated to another, the disease then is not contagious, and therefore because in the knobs there is no such excrement contained, or if it be contained, it is not carried to the genitals, therefore that disease shal not be contagious; next of al by experience, for he writes that a certain noble man of *Padua*, who had used Guajacum almost twenty times, and was thrice anointed with quicksilver, yet could never be cured, and though he lay with Virgins yet he never infected them: and out of *Antonius Musa* he relates of one, who had a wife possest with the Veneral disease about her breast, yet he never contracted the disease. *The Veneral disease is contracted only by contagion. Whether it be alwaies contagious?*

But here we cannot assent to *Saxiona*, but we hold that every Veneral disease is in its manner contagious; but whereas he objects against us experience, it doth not follow, that if one sick of the Veneral disease doth not actually infect another, that the disease it self is not contagious; for that an effect may follow, there is necessary both an agent, and a disposition required in the patient. Hence we see that many do converse with those sick of the Plague, and are not infected, yet we must not conclude from thence, that that Plague was not contagious: & *Gabriel Fallopius de morb. Galli. Cap.* 22. makes mention of twelve Schollars, that had to do with one whore, yet of al them, three only were infected. And *Saxonia* himself affords an answer to this argument, while he writes, That this disease is not contagious if nothing breath forth from the part affected, which may be communicated to another, the which may happen in the knobs and callosities; or if any thing do breath forth, and be not received by another. Therefore though

one have an ulcer in his head, or a knob in his thigh, but the Genital parts be found, 'tis not necessary he infect her he lyes with. But whereas he teacheth that the inveterate Veneral disease is less contagious, than the new, or middle aged it may in its manner be granted; and from that very thing we may collect, that the Veneral disease is not only the cause, but also the disease. For when as this disease is communicated by the cause or contagion, it may come to pass, that the cause may be for the most part taken away, which doubtless happned in him who so often used the decoction of Guajacum, and was thrice anointed; and such men indeed, if the disease be still upon them, but the corrupt humors being for the most part emptied by sweaters and unctions, they are not so contagious, as those, who were lately infected with this out of whom those malignant humors have not yet been emptied.

Therefore we conclude, though for certaine reasons, those who are sick of this disease do not alwaies infect others; yet at this day there is no man taken with this evil, but who hath been infected by contagion from another, and so this evil at this day is propagated only by contagion.

The first original of the veneral Disease.

But how, and from what causes this Disease was raised, when it first appeared in Europe, Authors are diverse in their opinions; and whenas they themselves, who lived about the rise of this disease, could not agree in this business, by much less shal we which are now removed above an age from that time, be able to reconcile them; therefore we shal only reckon up their opinions. The most learned *Leonicenus*, and *Fracastorius*, and certain others, were of this opinion. That this disease at its first rise was epidemical, and proceeded from a common cause, when at its first beginning, boyes, men, old folks, Girles, women, were infected, and as *Hieron. Fracastrius* writes *de morb. Gallic. cap.* 7. Though the greatest part of mankind hath contracted this disease by contagion, it hath been observed, that a number of others infected by themselves without any contagion, have suffred this disease. Besides *Fracastorius* thinks it impossible, that in so smal a time, contagion which of it self is slow, nor is not easily received, could spread it self over so many lands, being first brought by one fleet of the Spaniards, when it is plain that either at the same time, or very neere it was seen in *Spain* and *France*, in *Italy* and *Germany*, and almost al *Scythia*; which if it be so, there is no reason, why we should not grant this disease to have been first of al epidemical: yet this makes me doubtful because that no German Physitian, nor of the neighboring places, hath taken notice, that this disease was knowen in Germany about that time. In which it appeared in *Italy*, when notwithstanding they have most diligently described, the English sweating disease, the disease in *Hungary*, and the like diseases newly sprung up.

Whether it were first of al an epidemical disease.

But what was the cause of that epidemious disease, if it were such a one, those Authors themselves do differ in opinion; indeed they agree in this. That it had its original from the fault of the ayre, but whence the ayre contracted that fault, therein they differ. Some were of opinion, That this disease had its original, from the great inundation of *Tiber*, and other Rivers, which hapned in the time of *Adrian* the sixt, Pope of *Rome*: for the Summer following they think by that corruption and filth left by the waters, the ayre was infected with putrefaction, and thence this disease did proceed. But truly this evil cannot be imputed to that inundation of waters, since that happned chiefly at *Rome*, but this disease first appeared at *Naples*: besides, those inundations of waters are wont rather to cause pestilent diseases, and there has often happned such inundations before, yet such a disease was never caus'd by them before. Others do more probably (if this disease were at first epidemious) refer the cause to the Stars. And *Fracastorius* writes concerning this business, *lib.* 2. *de morb. contag. cap.* 12. That it ought not to seem wonderful, that new and unusual diseases do appeare at certain times, and he proves it by examples and histories of divers diseases; and to pass by others, in the memory of our Grandfather that malignant Feaver raged, which is commonly known by the name of the English sweat, the like of which we have not read in any History before, wherefore he thinks it is not strange, if also the French disease not known before through many ages in our Orb, did now first of al break forth. And there wil come (saith he) other

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new and unuſual ſickneſſes, when time ſhal bring them; as there was the thing out amongſt the Ancients, which afterwards was ſeen no more. This ſame diſeaſe wil dye and be extinguiſht, and by and by again wil be renewed, and ſeen again by our Nephews, even as in former Ages, it is to be beleeved, it was ſeen by our Anceſtors, for which there are no ſmal ſigns yet evident. A certain Barber a friend of mine, had a book of certain experiments, very ancient, amongſt which was written one amongſt the reſt, whoſe title was, For the thick ſcabb, which happens with the paines of the joints; he therefore when he diſeaſe was very freſh at firſt, remembring this medicine, asked counſel of ſome Phyſitians; whether he might uſe that medicine in that new contagion, which he thought was ſignified by that thick ſcabb: but the Phyſitians viewing the medicine, ſharply forbad him, becauſe it conſiſted of quickſilver and ſulphur. Happy man if he had not conſulted with thoſe phyſitians, being like to be very rich with an incredible gaine; but he obeyed them, nor durſt not make tryal of his medicine, which at laſt he did try, and finding it to be excellent good, he was very ſorry, that he had uſed it too late, the profit being now carried away by others. Thus far *Fracaſtorius*.

But he refers the cauſe of this diſeaſe newly ſprung up, to the conjunction of *Saturn*, *Mars*, and *Jupiter*, which happned at that time. Others hold that in the yeare, 1483. In the Ides of October at two of the clock after noon, That there was a conjunction made of *Mars*, *Jupiter*, the *Sun*, and *Mercury* in *Libra*, in the eight houſe, which is the houſe of Sickneſs, and that *Jupiter* was burnt; and furthermore the ſame yeare on the Calends of November in the ſame houſe and ſigne, there was a conjunction made of *Mars* and *Venus*, alſo of *Jupiter* and *Venus*. Others as *Nicolaus Maſſa de morb. Galic. cap.* 6 refer that diſeaſe to the conjunction of *Saturn*, *Mars*, and *Venus*, which happened in *Scorpio* about the riſe of this diſeaſe. But as it is not impoſſible, for certain configurations of the Stars to induce certain diſeaſes, ſo no man is able eaſily to render the ſpecifick cauſe of this diſeaſe, if it were epidemious. Truly al the effects of the Stars are good and benigne, and nothing evil in it ſelf doth proceed from them; yet by accident it may come to paſs, whiles they alter the ayre & the bodies of men after this or that manner, that they may produce evil diſeaſes, whenas in their way they are Authors of the generation and corruption of natural things, but that they could produce this diſeaſe in ſpecie, I think is not yet explained; and *Fracaſtorius* had hopes indeed, that this diſeaſe was in its old age in his time, and that in a little while after it would ceaſe in the alleaged place; as alſo in his *Syphilis*, in theſe Verſes.

For when the Fates ſhal pleaſe again, you'l ſee
Ere long, that in dark night 'twil buried be.

But his hopes hath deceived him, whenas now it hath laſted above a hundred and forty yeares, and hath bated nothing of its cruelty, as moſt are of opinion.

Others on the contrary think this diſeaſe was not epidemious, but ſporadical and contagious; and firſt of al this perſwades many, becauſe it hath laſted even unto theſe times, whenas epidemious diſeaſes, which have been raiſed by the influx of the Stars, have ceaſed a little while after. And therefore they do not think this diſeaſe ought to be accounted for epidemical, whenas it hath already laſted above 140. years; unleſs perhaps this reaſon may be given for the continuance of this diſeaſe, becauſe the infection of this diſeaſe is not ſhunned, as that of the peſtilence. For if the Plague begin to ſpread any where, al people, as much as they are able, and 'tis poſſible for them, do fly from the converſation of the ſick, and reject al infected houſehold ſtuff; nay in *Italy*, if the Plague begin to ſpread in *Germany*, or other neighbouring Countries, they ſtop up al publique waies, and deny al ſtrangers that are ſuſpected, any admittance into *Italy*; But many men knowingly and willingly have to do with ſuſpected Harlots, and publique Stews ful of infected whores are tolerated; therefore if the ſame diligence and curioſity, which is uſed in ſome places in the time of the peſtilence to exclude the infected and ſuſpected perſons, from the ſociety of others, were made uſe of to reſtrain that rambling whoring

perhaps

perhaps this disease also though it be contagious, might be rooted out.

How the Veneral disease was brought into Europe.

Yet the same men who think this disease is not epidemous, but sporadical, and contagious, are againe divided into divers opinions concerning its original: For some were of that opinion, that first of all it had its rise at *Valentia*, in *Hispania Tarraconensi*, where one sick of an Elephantiasis, bought a night's lodging of a noble Whore for fifty peices of Gold, and infected her, and thence it came to pass, that others who had to do with her were infected, and so in a short time this evil was disseminated amongst a many. But the Idea of an Elephantiasis is one, and of the Veneral disease another, and therefore one sick of an Elephantiasis could not raise this disease.

Others think this disease was first brought out of *India* by the Spaniards into the French Army at *Naples*, who maintaine that this disease was epidemical in *India*, of which we spake before, *Cap.* 1. But for what reason 'tis epidemous in some Countries in *India*, whether by the fault of the aire, or water, or provision, is not yet explained by Historians.

Leonhardus Fioravanti his opinion of the Veneral disease.

Leonhardus Fioravanti, a famous Empirick in his time in *Italy*, hath a peculiar opinion of the original of this disease, which I have met withal in no other writer. For he in his book written in the Italian Tongue, which is entituled, *Capricci Medicinali di M. Leonardo Fioravanti, Libri tre*, writes thus of the original of this disease, both amongst the Indians, and in the French Army at *Naples*, *lib.* 1 *Cap.* 26. When saith he, there was War between the French and Spaniard at *Naples*, and there was great want of provision, especially of flesh, those evil imployed merchants who brought victuals to the Camp, had privately prepared the Carkasses of dead souldiers into divers kinds of meates and dishes, and sold them every where about to the army, which flesh, whanas they had eat of it a long time ignorantly, most of them were taken with this disease, and became ful of pustles and paines, and many also had their hair fal off; and he writes, that he knowes the business was so, from one *Paschalis Gibilottus*, a Neapolitan, an old man, of ninety eight yeares of age, who hath told him, that at that time when *John* the Son of *Renatus*, Duke *Andegavensis* waged war against *Alphonsus* King of *Naples*, about the yeare 1456. that he hath often heard from his father, who was such a Merchant in the Army of King *Alphonsus*, that in want and scarcity of victuals the Souldiers on both sides by eating of mans flesh, which they fed on for a long time, contracted this disease, and the same *Fioravanti*, adds, that he might be the more certain of this business, he bred up a Sow in his house, and added to al her meat somewhat of hogs flesh, and that within few dayes her bristles and hairs fel off, and she became ful of pustles; then, that he fed a dog for two months only with dogs flesh, which afterwards became ful of pains and pustles, and lost his hair. From which experiments he concludes; that every living creature if it be nourisht with the flesh of its own species will be taken with this disease, which at this day is called the French: and he thinks this is the very cause, that this disease is epidemious in the *Indies*, because there are those man-eaters, which do feed on mans flesh.

But truly I do wonder that so many Italians and French, who have writ of this disease have made no mention of this cause, neither does the relation of that old *Neapolitan* seem to fit with the time. For that disease was not known in the year 1456. at which time *John* the Son of *Renatus*, Duke *Andegavensis*, waged War against *Alphonsus* King of *Naples*, but in the War which *Charles* the eight King of *France*, waged with *Alphonsus* King of *Naples* about the yeare 1493 or 94. then grant it be, that if a creature nourisht with the flesh of those of its own kind, be taken with pustles and pains, and suffer the falling off of the hair, yet the question stil would be, whether that disease be the very Veneral disease, and such as may be transfered by contagion to others, and especially by Venery. For the essence of the veneral disease doth not consist in pustles, and the faillings of the hair, but in an occult malignity, by which also its ulcers do differ from other ulcers. Yet it is easy for any one to make tryal, of that which *Fioravanti* experienced. And if the

business

buſineſs ſhould be confirmed by experience, that if an animal nouriſht with the fleſh of its kind, do contract this diſeaſe, thence a reaſon may be rendered, why this diſeaſe is endemious to the people of *India*, to wit, becauſe its inhabitants do feed on mens fleſh: although here we meet with a doubt, for al the people of *India* are not men-eaters, and therefore we muſt enquire out of the Hiſtories of the *Indies*, whether this diſeaſe be endemious amongſt the men-eaters only, or amongſt the other people of the *Indies* alſo.

Andreas Cæſalpinus

Andreas Cæſalpinus, lib. 4. de morb. Cap. 3. writes that he hath another Hiſtory of the original of this diſeaſe, delivered by them who were preſent, to wit, from an Aretine ſoldier, who ſerved in that war; he related that there is a town in the *Veſuvian* Mount which is called *Suma*, where there is plenty of generous wine which is called Caudy wine, which was privately left by the Spaniards in the night, when the French had beſieged it, but they infected their wine by the mixture of blood which they drew from them which were ſick in the hoſpital of St. *Lazarus*; and the French men entering in, when they had filled themſelves with that wine, began to be ſick of diſeaſes and ſymptomes, like unto the Elephantiaſis. But if this were true, rather the Elephantiaſis than the veneral diſeaſe had been thus raiſed.

Aurelius Minadous

Aurelius Minadous de Virul. Vener. Cap. 30. propounds a peculiar opinion, & holds that this virulency did firſt break forth from the moſt filthy wombs, of moſt impure Harlots, and for this cauſe, becauſe no body that hath lived cleanly, or that hath converſed with a cleane woman, is taken with this evil: but he thinks this evil proceeded firſt, when women were made very unclean, when they had received a various mixture of ſeeds. For as ſaith he one ſort of meat, is the cauſe of health in a good ſtomach, but variety of meats doth oppreſs the ſtomach, and breeds an acid and nidorous crudity, and every where heaps up excrements; ſo one ſeed only is familier and wholſome for one womb, and cauſeth fruitfulneſs, on the contrary the multitude and variety of ſeeds, doth ſo affect the womb, that by its corruption it produceth bad, nay the worſt of excrements, and from that ſordid ſubſtance there is a corruprion hard to be explained, or putrefaction which doth generate ſuch venenate excrements. But when as he might eaſily underſtand, that thoſe rambling luſts were in uſe not only in the war at *Naples*, but long before when there was publique Brothel Houſes at *Rome*, and yet there was no ſuch diſeaſe raiſed; he would have his opinion to be underſtood not of any women, but only of the *Indian*. For they by the mediation of the Heaven, Air, Waters, and thoſe places, by their peculiar form of feeding did contract this poyſon, which afterwards by *Columbus*, and the Spaniſh Army was diſſeminated in *France*, and hence through the whole world. But though it muſt not be denied, that the conſtitution of bodies is divers in divers Countries, and I remember that I have read in the Hiſtories of Navigation, That when certain people of *Europe*, had found certain Ethiopian laſſes playing on the ſea ſhore, and had layn with them, preſantly ſome of them died; yet how the buſineſs is in *America*, is worthy of further inquiſition: and if there be any ſuch fault in thoſe women, 'tis probable that comes to paſs, not ſo much from the commiſtion of divers ſeeds, but rather as many Authors report, from this, That if any one have to do with a woman in *India* whiles ſhe hath her courſes, he his taken with that diſeaſe; for that whenas 'tis every where unwholſome, and therefore alſo was peculiarly and ſeverely forbidden the Jewes by God in holy Writ, may in a ſpecial manner be hurtful in the Indies.

The Veneral diſeaſe is contracted only by contagion.

Therefore letting theſe paſs, let us hold faſt this, which is granted by al, that this diſeaſe at this day is no otherwiſe contracted, but by contagion, and chiefly by lying with thoſe that are infected, whence deſervedly doth *Gabriel Fallopius de morb. Gallic. Cap. 13.* Wittily deride thoſe women, who when they were ſick of the Veneral diſeaſe, nevertheleſs did boſt themſelves to be chaſt, and ſaid they contracted this diſeaſe by ſprinkling themſelves with the holy water which was infected.

How many waies the contagion may be contracted.

But this contagion, by which only now adayes, we ſay this diſeaſe is diſſeminated, is received divers waies. For ſometimes 'tis transferred with the ſeed and menſtruous

Somtimes 'tis Hæreditary.

ſtruous blood from the Parents to the Child, and the Diſeaſe becomes Hæreditary; for when the blood, out of which the Seed is generated, is infected and vitious, the like Diſeaſed ſeed is generated, alſo the Mothers blood being impure, with which the Child is nouriſht, it Pollutes that, which pollution afterwards in thoſe brought into the World doth ſooner or later ſhew it ſelf, according to the greater or leſſer ſtrength of that virulency: which manner of original of this Diſeaſe, if any one wil deny to be properly by contagion, becauſe it is not by the contract of two bodies, viz. a ſound and a ſick, he may for al me; yet let him know this, that then that malignity in the body of the infant is not generated, but from the infected parents by the ſeed, or the Mothers blood is communicated to the off-ſpring.

But by thoſe that are born into the world, the ſame evil may be contracted two waies: the firſt is, when with the nouriſhment and milk, the evil is communicated to infants by impure Nurſes; which way indeed is the powerfulleſt of al: for whenas the milk they ſuck is changed into blood, and that is the nouriſhment of the whol body, the poyſon this way is diſperſed into the whol body, and inſinuates it ſelf moſt intimately with it, and therefore thoſe that are this way infected, are ſeldome cured, and not without a great deal of Difficulty.

The other way is by contagion ſo called properly, and in ſpecy; where firſt of al 'tis enquired, whether there be any contagion in the Veneral Diſeaſe at a diſtance, ſo that if one do neither touch with his body one infected, nor the fuel which conteins in it the contagion, yet nevertheleſs may be infected with the Veneral Diſeaſe; truly there is no example given of this cauſe, but what *Manardus* teacheth, Lib. 7. Epiſ. 3. and alſo ſome others affirme that there is a French Ophthalmy: but when as this Diſeaſe of the Eyes in other caſes is oftentimes contagious, it is no wonder, if one converſing with a ſick man that is troubled with a French Ophthalmy, and earneſtly look upon his Eyes, that he alſo may contract ſuch an Ophthalmy. Yet this cannot be granted, that as the Plague may be transferred by the Air to others in diſtant places, ſo alſo the Veneral Diſeaſe may be communicated; for dayly experience doth Teſtefie, that Phyſitians and many others, do familiarly converſe with thoſe infected with this evil, yet are not infected by them.

Whether it can infect at a diſtance.

Therefore this evil is chiefly contracted by contact, and truely moſt frequently by whoriſh Copulation, when that virulence is communicated to the naked genital parts being ſoft, and porous, from the genitals of the other infected perſon; after which manner this Diſeaſe was firſt brought out of the *Indies*, by the Spaniſh Souldiers infected by the *Indian* Women which were ſick of this Diſeaſe, into *Italy*, and diſſeminated through the French Camp, and hence ſpred throughout all Europe, as we ſaid before according to the opinion of many Phyſitians. And though ſome as we ſaid even now, who have been infected with this Diſeaſe, endeavour to renounce the Cauſe of it; yet many if they live not chaſtly, yet they live cloſely, and *Gabriel Fallopius*, not without a Cauſe *de Morb. Gall. cap.* 10. ſcoffs at certain chaſt Matrons, as they boaſted themſelves to be, who ſaid they contracted this Diſeaſe by ſprinkling them with holy water which was polluted; he that beleeves this, let him beleeve that too, which *Averroes* writes, 2. *collect. cap.* 10. that a woman was got with Child in a bath, from ſome ſeed which wicked men had ſpent there: or with *Valleſius* let him correct the Aphoriſme, 36. *Sect.* 6. becauſe many Monks have been ſick of the Gout before the uſe of Venery.

How the Veneral diſeaſe may be contracted.

How men are infected by women in Copulation.

And truly men contract this evil from Women that are infected, becauſe in the act by reaſon of the concourſe of ſpirits, and the motion, the Womb being heated, Vapors are raiſed from the Malignant Humors in the womb, which are ſuckt in by the mans yard being of a porous conſtitution, and are received into the veins. But the man being infected, may infect a ſound woman, either by his yard, if that be infected and exulcerated, or by his ſeed, although his yard be not ulcerated, or both waies: for though the ſeed in men is not always wholly corrupt, whenas we ſee many men infected with this diſeaſe do get children; yet it is altered & infected, from whence not only

How Women by men.

the

the Issue contracts this evil, but also a Woman may be infected by it.

But though this evil be most frequently contracted by whorish Copulation, yet by contagion it may be derived to others, other manner of waies, viz. by sweat, if any one sleep in the same bed with one infected with the Veneral Disease, and be wet with his sweat; then by the filth and Excrements, or that flowing from Ulcers, and sticking on the Linnen, bed, or shirt, and garments, if any one lie in them, or put them on. The same Disease also may be communicated by slaver or spittle, so lovers are infected with the Kisses of Whores sick of this Disease, and infants by their Nurses, or if any one drink out of a Cup, or sup out of the spoon, which one sick of this Disease did use a little before; besides, infants may be infected another way, to wit if, they touch the brests of an impure Nurse with their mouth, and that for a double reason, either because they suck the infected and corrupted milk, of which I spake before; or because the breasts and nibbles of the Nurse are exulcerated: on the contrary, Nurses may be infected from infected infants, especially if they be troubled with Malignant pustles, or some Ulcer in the mouth; for the Nepples of their breasts whiles they are suckt by the Infant, grow hot, and their pores are more opened, whereupon they eatier receive in that virulence. *Other waies of contagion*

But no body is easily infected by the breath, as was said before, and without danger we may be conversant in the same chamber with those that are infected; neither are those Chyrurgions and Physitians which cure the veneral Disease, and dayly converse with the sick, any way infected; and if this Disease were contagious by breathing and at a distance, the whol world would ere now have been French, and the Disease would be more than Epidemious, as one writes; yet if any one sleep in bed with one infected, that he do receive his breath very neer, I wil not promise him free from this evil; whenas I know, Wives that have been infected by their Husbands sick of the Phthisick, and afterwards died of it.

This contagion after 'tis received into the body, staies not in those parts in which it was first received, but after the manner of other poysons, penetrates into the innermost parts of the body: and truely oftentimes discovers it self presently, within a few daies, somtimes lies hid a long while. And *Fernelius* writes, *de abdit. rer. Caus. Lib. 2. c. 14.* That it doth somtimes returne and revive after thirty years past, and for so long space the fewel of the disease does lie hid as dormant, and nevertheless they who think themselves free from al hurt, and that they are perfectly sound, do corrupt those with whom they lie, and beget an Issue possest with that Disease. The same is witnessed by *John Philippus Ingrassias.* And *Hercules Saxonia de lue Vener. cap.* 11. relates that he cured an Illustrissimo, who had knobs of the French Disease came out upon him, five and twenty years after he had taken the Disease. *How the Veneral virulency doth penetrate into the body.*

But what parts this virulency doth principally assault, we said formerly Authors did disagree, where we treated of its subject; many indeed do hold, that this virulency is chiefly an adversary to the Membranes, because the pains do most of al arise about the Perioštia, and external parts, where are many Membranes, in the head, Legs, Arms, breast-bone, and in them the periostium being eaten off, are raised knobs. But not only the Membranous parts are affected, but others also, as the Buboes, Tumors, Ulcers in divers parts, rottenness of the bones, falling of the hair, running of the Reins do testefie. And therefore we must enquire for a more common subject, which we said above was the Liver, and the similar parts dedicated to nutrition, and that have consent with the liver; for after the contagion hath pierced as far as the Liver (though in the interim it may corrupt the parts neer unto that, by which the Contagion was received) and hath imprinted a Malignant disposition on that, Sanguification is hurt, and a Malignant quality is imprinted on that blood, which is generated in the Liver, and so with the blood are generated Malignant Humors, which whenas they are troublesome to Nature, they are thrust forth to the Circumference of the body, and so *What parts are chiefly affected.*

not only pains are raiſed in the Membranes, but divers Diſeaſes and Symptomes alſo in other parts; and whereas the bones are not free, but they are oftentimes affected with rottenneſs, it is no wonder that the neighbouring perioſtia are affected, and moſt cruel pains raiſed.

The manner of the generation of the veneral diſeaſe. From al which it doth eaſily appear, what is the manner of the generation of this Diſeaſe, to wit, When the contagion of this Diſeaſe is communicated from one ſick of the Veneral Diſeaſe, either by the ſeed and blood of the parents, or by the ſucking of infected milk, or by Copulation, or by ſpittle, or by meat and drink, or by garments and Linnen, to any part of a ſound body, firſt of al the part which receives the contagion is affected and hurt, hence through that, the evil creeps into the Veins, and by them penetrates to the Liver, which when it hath put on an evil diſpoſition, and contracted a Malignant Diſeaſe, it generates vitious blood, containing in it the Seeds of the veneral Diſeaſe, which whenas it is an enemy to the body, by the expulſive faculty 'tis driven from the more noble parts to the Circumference of the body. And from thence the nouriſhment in the whol body is hurt, from whence are raiſed ſpots, Tumors, and divers bunchings out, Ulcers, falling of the hair, pains, and other evils.

The definition of the veneral diſeaſe. At length out of al thoſe things which have been ſaid hitherto of the Nature and cauſes of the veneral diſeaſe, we make this definition of this Diſeaſe. The veneral evil is an occult Diſeaſe, and peculiarly Malignant, taken by infection, and is infectious, chiefly an enemy to the Liver and nutritive faculty, and therefore nutrition being hurt in the whol body, it raiſeth divers Diſeaſes and Symptomes.

CHAP. V.

Of the Differences of it.

The Differences. BY ſome indeed there are reckoned up very many Differences of this Diſeaſe, and by *Braſſavola*, 234. but many of them unprofitable; the moſt neceſſary and profitable are theſe.

Firſt of al, as concerning the very eſſence of the Diſeaſe whenas that is unknown, from that of it ſelf, we can raiſe no difference: yet becauſe its activity depends on that eſſence and occult quality, theſe differences are fetcht from thence, becauſe the activity of this diſeaſe is ſomtimes greater, ſomtimes leſs. And Phyſitians have obſerved, that ſomtimes after unwholſome Copulation, the French Symptoms have preſently come upon men, but ſomewhat gentle, and a little while after have ceaſed again, without the adminiſtration of any remedy; but ſomtimes moſt grievous Symptoms have preſenly come on them, and the evil hath been rebellious, and could by no means or very difficultly be cured. And the writers of this diſeaſe report, That this Diſeaſe when it firſt appeared, had far more grievous Symptomes, than now it hath: but what was the Cauſe of this buſineſs, is not ſo clear. That might happen firſt of al, from the diſpoſition of the bodies that were infected. For whenas it appeared firſt in the Camps at Naples, and there was a great ſcarcity of proviſion, and a famine, doubtleſs in thoſe bodies alſo, there was proviſion of evil Humors for Diſeaſes, on which when this contagion fel, there it took ſtrength and increaſed: beſides this might make ſomwhat to that buſineſs, that in the beginning, the cure of this Diſeaſe was not ſufficiently known, whence it came to paſs, that this malignity alwaies grew worſe. This happens alſo in the Plague, of which the more there die, the poyſon alwaies grows the more vehement. For the malignity is fermented as it were, and exalted in the bodies of the ſick, unleſs it be oppoſed and overcome by Alexipharmacal means.

At its firſt riſe this diſeaſe was more grievous.

Secondly,

Secondly, its Differences are taken from the cauſes and manner of contagion while ſomtimes the Veneral Diſeaſe is hæreditary, and is derived with the ſeed and blood from the parents to the Iſſue: but ſomtimes after the birth, is communicated by Copulation, Kiſſing, Milk, Garments, and the like.

Thirdly, the third Difference is taken from the Diſeaſes and Symptoms ſupervenient, that this Diſeaſe is ſomtimes with Buboes, ſomtimes with running of the Reins, ſomtimes with falling of the hair, ſomtimes with pains of the joynts, ſomtimes with other Symptomes; neither do the Symptomes which follow it, and ſhal afterwards be reckoned up amongſt the ſigns, alwaies appear the ſame in al people: and *Euſtachius Rudius* writes, *Lib. 5. de Morb. occult. Cap. 9.* That he hath obſerved a thouſand times, that many young men have on the ſame day copulated with one and the ſame whore, and yet notwithſtanding one hath been taken with the running of the Reins, another with a Bubo, another with rottenneſs, another with pain in the Head, another with falling of the hair, and another with another different preternatural affect; which doubtleſs happens, by reaſon of the various indiſpoſition of bodies, and weakneſs of parts, and variety of Humors. For weak parts do more eaſily receive vitious Humors, than the ſtrong. And one body is more clean, another more foul, and abounds with theſe, or thoſe Humors, which when they are corrupted by the venenate Humor, do cauſe theſe or thoſe Diſeaſes and Symptomes: therefore if we ſhould number up the Differences according to the variety of Diſeaſes, and Symptomes, which are ſomtimes joyned together and complicated, ſomtimes Fewer, ſomtimes more, we might make very many indeed, of which as was ſaid even now, *Braſſavola* reckons up 234. more Nicely than profitably.

Fourthly, the fourth Difference is from the time, that this Diſeaſe is ſomtimes new, ſomtimes inveterate, one in the beginning, another in the augment, another in the ſtate, and another in the declination.

Out of which, and eſpecially from the Difference of time, and the variety of Diſeaſes, and Symptomes that accompany this Diſeaſe, *Julianus Palmarius*, doth commodiouſly conſtitute four dergees of this Diſeaſe, *de lue Vener. Lib. 1. cap. 4.* The Firſt and lighteſt degree is, when only the hairs of the Head and beard do by little and little fal off, without any other hurt of the body. The Second degree is worſe, when the whol Skin is ſpread over with many ſpots not bunching out, and thoſe ſomtimes ſmal, like to a lentil ſpeck; ſomtimes much broader, and both, ſomtimes red, ſomtimes yellow. The Third degree is yet more grievous, when not only ſpots but true puſtles and bunches break forth, firſt of al indeed about the forehead, and Temples, and behind the Ears, then every where in the Head, and at length in the reſt of the body. The Fourth degree is, when now the Diſeaſe being inveterate, it aſſaults and corrupts the ſolid parts, the bones, Ligaments, Membranes, and Nerves. In which there are collected many thick, glutinous, and maligne Excrements, which when they reſt about the tendons, or the Perioſtia, and prick and pul the Membranes from the bones, there are wont to be cauſed implacable pains, growing worſe towards the night, from which Excrements alſo by degrees do grow hard knobs, with far greater torment which are equally hard as the bones. Which if they be fixt in the bones, they do ſo enlarge and diſtend them, that the bones oftentimes become of a monſtrous bulk and figure: moreover that malignity and Acrimony doth by degrees eat away, and with rottenneſs conſume the bones, and for the moſt part not hurting the Skin that lies over them; and *Palmarius* writes there, that he hath ſeen many in whom the Pericranium, and the Skul under it, hath been found wholly eaten away with putrefaction, and conſumed with rottenneſs as far as the dura mater, the Skin of the Head not being hurt at al, without any Feaver, and without

Degrees of the veneral diſeaſe.

without vomiting, of which one or two have been seen living without a Skul. Of which by and by shal be said more in the Diagnostick and Prognostick signs.

CHAP. VI.

Of the Diagnostick Signs.

BUt though out of those things which have been spoken before of the History of this Disease, the Diagnostick signs of this Disease might easily be fetcht, yet in this place the same are to be propounded in specy. But first of al, we must remember this, those signs as *Galen* teacheth, 1. Aphor. 17. and else where, which ought certainly to denote a Disease, which are commonly called Pathognomonical, ought to be not only proper but inseparable, so that where they are, there is the Disease, and they being taken away the Disease is removed. But though as in many other diseases, so in the Veneral, there is not one sign, by which the Disease may be known, yet a concourse of signs, may do the same. Yet what that concourse is in the Veneral Disease, is not easie to define: whenas in this Disease there is a great Accumulation of Symptoms and Diseases, and therefore this Disease hath affinity with other Diseases. Which thing doth cause, as was said before, that many when they saw almost the same concourse of signs, in that Epidemious disease, which *Hippocrates* propounds, the 3. *Epid.* they thought the Veneral Disease was described there, and others referred it to the Elephantiasis, but the reason why it is hard to define the concourse of signs in this Disease, is this, because the Liver and nutritive faculty of the whol body is chiefly hurt. For when the heart or brain is hurt, their hurt actions do easily appear, being such as are simple, and restrained to few parts. But when as the Liver affords nourishment for the whol body, from thence if nourishment be hurt, do happen divers Diseases and Symptomes; for though the nutriment of the whol body be one, that is blood, yet almost an innumerable variety presents it self in every part, according to the variety of the parts which are nourisht, whenas 'tis necessary that every part do peculiarly assimilate its nourishment; yet if we consider the precedent causes, those things which are present, and what things are helpful, what hurtful, or the Remedies, neither can this Disease lie undiscovered.

The diagnostick signs of the cause.

As concerning the causes, first of al if the parents be, or have been sick of this disease, and some signs in the infant present themselves, which argue the Veneral disease, there is scarce any reason to doubt of the Disease. In like manner 'tis, if an infant have sucked a nurse sick of this disease.

But if any one born of sound Parents, and nourisht by the milk of a sound Nurse, yet have diseases and some Symptoms, which give suspition of this Disease, we must diligently enquire, whether he hath had to do with infected persons; which if he confess, the case is plain, and there need no further doubt of the species of the Disease; but if, as it often fals out, one to preserve his Honor and reputation, deny that he hath acted any such thing, then we must enquire into the condition and course of the life past, of the husband or wife, if the party be married. For from these things somtimes we have no slight conjectures of the infection. But if there be no ground for such a conjecture, we must further enquire, whether he hath slept in the same bed with one infected with that Disease, or hath used his garments. But if out of al these there can be had no firme conjecture of this Disease, the present state of the patient is diligently to be considered, which indeed is one in the beginning of the Disease, another in the increase, and another when 'tis inveterate; whence also the signs of this Disease, beginning, encreasing, inveterate, are wont commonly to be delivered. And truely to know this Disease when 'tis Inveterate, is not very difficult, as

shal

shal be said by and by: but whiles it yet lies, and is in the first blade, then to know it is not so easie. For as plants and trees when they are at ful growth, are known by the vulgar, but to know them at their first appearance, is the part only of an artist and good herbarist. So also this Disease, when it discovers it self by diverse Diseases, and Symptomes, 'tis known even by the vulgar, but when it lirks in obscurity, 'tis not discovered but by experienced Physitians.

The signs of the veneral disease in its beginning.

Yet there are some signs, which may discover this Disease, even at the first beginning; the first is, that they who are taken with this Disease do presently (without the appearance of any signs of a Feaver imminent) perceive a kind of weariness and heavines in their whol body, and somtimes a drowsines after sleep. There is a vehement and wandering pain, which is felt somtimes in the Head, somtimes in the Muscles, somtimes about the joynts, and this pain is more troublesome towards night than at other times of the day. The fresh color of the Face is changed strangely, and some write, that there is a Livid circle appears under their Eyes, such as we usually see in Women that have their Courses: there is added to these a sadnes, fear, and those that before were merry and jesting, become sad and pensive without any cause. All which signs are of greater force if the signs of the Veneral Disease did go before, and vanish without any convenient, and sufficient means. And truely if this evil be contracted by Copulation, and hath not yet plainly possest the Liver, but sticks yet in the Privities, then chiefly this Veneral Disease at its beginning, discovers it self by the running of the Reins, Ulcers in the Privities, and buboes, for when that Malignant vapor, is first of al communicated to the Testicles and genital vessels, the seed is corrupted, and the generation of seed is depraved in the genital vessels: whence instead of good seed there is generated a stinking and corrupt Humor, which doth irritate Nature to expulsion. From whence also the Gonorrhæa, although improperly so called, is easily distinguished from that running of the Reins which is not French, becaus this gallical is joyned with a great heat, and pain, somtimes also with an Inflamation of the Testicles, and Vessels resembling a varix; the matter which is cast forth is far different from seed, viz. Yellow, green, Acrid, corroding the glans; neither doth it yeild to those Remedies, with which a true Gonorrhæa is cured. Next of all there appeare pustles in the Privities about the bigness of a grain of Millet, and somtimes they compass the whol Ring, which when they are broken, there remain white Ulcers which in process of the Disease grow deep and callous, of divers colors, and with pain joyned with them. Thirdly, also Buboes show forth themselves in this Disease; for though somtimes the Buboes do precede an Erysipelas or a Rose, yet then there went before those causes which do effect a Rose, as fear, frights, anger, and the bubo is extended towards the Thighs, as it were by a red line, and a little after the Erysipelas breaking forth, it vanisheth; but if the Bubo be Veneral, 'tis not extended according to the longitude of the Thigh, but rather obliquely, and imitates the situation of the spermatick Vessels. For in unwholsome Copulation the seminal vessels are easily first of al infected, which whenas they have their Original from the Vena Cava not far from the Liver it self, that virulency is easily communicated to the Liver, which being affected drives it back again by the same waies from it self, from whence are caused both the Buboes, and the running of the Reins. And thus these two Diseases are for the most part complicated, and being Joyned are a sure sign of the veneral Disease, and one failing, the other is of force; but if this evil be contracted without whorish Copulation, and if by kissing, there are Ulcers raised about the mouth, if by giving suck to an infected infant, there are inflamations about the breasts, pustles, and clefts; if from Garments and common lying together, there are pustles every where raised in the Skin.

But

The signs of this disease increasing.

But if the evil do now increase, and grow more grievous, and the virulency it self be already communicated to the Liver, and thence the nutrition in the whol body be depraved, diseases and symptomes of al kinds, such as were reckoned up before, *cap.* 2. in the history of this disease, do arise, which indeed though singly by themselves they afford not a proper and inseparable signe of this disease, yet if they be taken together, and their peculiar condition be diligently considered, they may clearly enough detect this evil. For there is scarce another disease, in which there is a concourse of al these, nay there are many of them so proper to the Veneral disease, that they are found in no other disease after that manner. How the buboes which are seen in the beginning, and sometimes in the increase of this disease, may be distinguisht from other buboes, was said even now; the veneral pustles are some of them crusty, others without a crust, the crusty are chiefly the signs of this disease, and sometimes they are eminent, that in the head and forehead they resemble the horns of a Ram, under which sometimes is contained matter. Somtimes none, and they appeare in the face, head, beard, whol body, but especially about the privities and hips. And *Fallopius* writes that these kinds of Veneral tumors, may be distinguished from those which are not Veneral after this manner; That the Veneral if they be rubbed and the skin taken off, three daies after they appear unchanged, but benign pustles if they be rubbed, are increased by the attraction of blood, and that good, and alimentary. So the the tumors which are commonly called Gummosities, if they be joined with a swelling, or do firmly adhare to the parts void of flesh, and the bones, especially if they be in the head, forehead, in the fore part of the Leggs, are a most certain signe of the Veneral disease: for the Veneral matter hath an eating virulency even in a crass humor, and joined with paine, the like of which is not in other tumors, which do proceed from a thick matter. But though ulcers do happen also in many other diseases; yet if they rise chiefly in the yard, and especially on the foreskin, and about the nut, and towards the end of the yard, or also in the mouth and palate, the uvula or jawes, and those to putrid and stinking, and there was no inflamation of those parts precedent, nor signs of the scurvy, they are also signs of the French Disease; also the falling of the hair causeth no light evidence of the disease; for if after childhood, no other disease foregoing, which is wont to be accompanied with the shedding of the hair, the hairs of the head, and especially of the beard and eye-brows fal off, and also there appear ulcerous pustles, or a filthy Scab, this is altogether a sure signe of the French Disease. In like manner Chapps and clefts in the Palms of the hands, and soles of the feet, if no other cause preceded, are an undoubted sign of this evil, so also those bunches sometimes low and broad, somtimes somwhat long, and those excrescencies which they cal ficus, condylomata, and crusts, if they appeare in the privy parts, or about the Arse-hole, do surely enough discover this disease; pains of the head, although they happen in many other diseases, yet if their bunchings out, and gummosities in the skin, if there was a Gonorrhea and it be stopped, if a bubo and it be vanisht, those also are sure signs enough of this disease; paines also in other parts may likewise discover this disease, for if the paine be not in the very joints, but in that part which is in the middle of the bones, and neer to the Joints, as upon the skin, or upon the shoulder bone, which is between the head and the joint of the elbow, and they be most cruel and sharp, and are exasperated towards the evening and night, they are also sure signes of this disease. There is familiar also with this disease, such a distillation, by which there is emptied by the mouth, and nose, much flegm and watrish matter, by which the parts through which they pass are exulcerated; but in the first place the sure signe of this disease is that French Gonorrhea, of which was spoken before. Last of al this also is a sure signe of this disease, if the aforementioned diseases and symptomes be not taken away, or made more gentle, by medicines that do work by manifest qualities, applyed according to art, but rather do grow worse, but are mitigated by those proper and specifick remedies.

Least

Last of al, if this evil be inveterate, diseases and symptomes of al kinds may happen, callous, fistulous, and cancerous ulcers, knobs in divers parts of the body, rottenness of the bones in the Leggs, Armes, especially in the Skul, the bone of the Palate and Nose, a Hectick Feaver, Consumption, Pthisick, evil habit of the body, Falling-sickness, falling of their teeth, Deafness, Blindness. *Vidus Vidus, lib. 2. de curat. membrat. cap. 18.* reports that he saw at *Barciconia* a Spanish Souldier, who by the French Pox suffered a rottenness of Skul, and afterwards fel into an epilepsy, that filth distilling from his rotten skul, and pricking the membranes of his brain, from which notwithstanding he was freed by cauterizing his Skul with a hot Iron; and *Forestus lib. 7. Observat. 9. in schol.* relates of one infected with the French Pox, though he seemed to be wel cured, yet was afflicted with a long and continual paine of his head, which could be cured by no remedies, til at last his Skul being opened, there was found under it, upon the dura mater somwhat black like a wevil, which worme when it was taken away, that pain ceased, nor returned no more. And *Johannes Schenckius ex* D. *Georg. Garneci observat.* relates of one sick of the French Pox, that was il cured, who was taken with a great inflamation in his palate, in the five-like bone, in his uvula, and al the neighbouring parts, which presently turned to a Gangrene, and that to a cancer, that every day he voided somwhat, of those corrupt and putrefied parts, and the uvula, and next parts, being first of al cast forth, at last he spit through his mouth his very brain with a most noysome stink. And *Felix Platerus, lib. 1. observat.* makes mention of an Abbot who by the French Pox was made blind, deaf, and dumb, who could no otherwise understand and perceive the meaning of others, but if they with their finger or a peice of wood drew letters, expressing some sentence upon his bare arme, from al which singly perceived he made a word, and from many words a sentence: God the just Judg doth sometimes punish wandring lust, with so grievous and horrid a punishment. *Signs of an inveterate Pox.*

As concerning the differences of this virulency, although its formal essence be unknown, yet there is a certain difference. According to its manner of acting and its vehemency, which is known from its effects; for sometimes more, sometimes fewer: sometimes the contagion and active power is great, sometimes less: and *Eustachius Rudius* reports *de morb. occult. lib. 5. cap. 10.* that he knew some whores infected with so powerful a French Poyson, that al who had to do with them were not only presently infected with the same evil, but were wholly possest with most grievous symptomes, which could not be removed nor mitigated, by any remedies, or art, nay some of them not long after died. But we know the vehemency of this evil, if as was said even now, some be presently infected, if the pain be most cruel, if the erosion pierce to the bones, if many putrid and stinking excrements proceed every where from the body. For by how much the evils are the more, and more grievous, by so much the power of this virulency is the greater. *Signs of the differences.*

CHAP. *VII.*

Of Prognosticks.

But that we may know, what hopes there is concerning the event of this disease, we must enquire whether the disease is like to be short, or long, whether easy or hard to be cured, and at last what end it shal have.

But first of al concerning this disease, 'tis wont to be questioned amongst some Physitians in genera., whether it shal once have an end? *Fracastorius* indeed did hope for it, as was said before, and thought, that even in his time this disease grew aged and that a little while after it would wholly die, chiefly for this reason, because he thought it was epidemious, and took its original from the Starrs, which impressions of heaven do not last alwaies, but in process of time are changed, and because he *Whether this disease shal cease.*

saw

saw this disease did grow more mild. For as *Jul. Palmarius* writes of this subject *lib.* 1. *de lue Vener. Cap.* 5. it was reported, that this disease at its first rise was so filthy, that that which reigns now is scarce thought to be of the same kind; for there were innumerable ulcers, rough and standing out, in the figure and bulk of an acorn, a filthy humor flowing from them, and such a stink exhaling that his nose that it reached, was beleeved presently to be infected. The colour of the pustles was between black and green, as much tormenting the sick with the sight of them, as with their pain. Therefore al people did shun the sight of them, and so abstain from touching them, as in no disease besides. But *Fracastorius* his hopes deceived him, for as yet we do not see this disease grow old, much less cease, and though the filthiness of the ulcers and pustles be more tolerable, yet in pains and torments it is grown more cruel, as the same *Palmarius* writes. It is more likely, that as long as those copulations and conversings with infected people, and wandering lusts shal indure, so long also this disease wil last, and be propagated by contagion. For such is the nature of this poyson that it doth not suddenly kil a man, in the interim those who are sick of that disease, are infectious those waies, of which we spake before. Whenas therefore there are every where many, who are poluted with that disease, and others converse with them, there is yet no hopes that this disease should cease ere long, whenas the effect doth not cease, unless the cause be taken away. Neither is that reason firm enough, which some who are of a contrary opinion do alledg; for they say whenas this disease is a contagion preternatural and violent, it must necessarily have an end, whenas those things which are preternatural and violent have not perpetual causes, and therefore must needs cease to be; but the answer is easie; nothing indeed that is preternatural and violent, is of it self perpetual, yet if the cause be perpetual, that also may be perpetual. Therefore though as the plague is sometimes extinguished, so this disease also might be, if the same diligence were used, which is in preventing and curing the plague, as was said before: yet because there are alwaies men, who are sick of this disease, and can infect others, and others do not abstain from their society, even this disease shal continue so long, as that contagion shal last. And therefore *Eustachius Rudius* rightly of this subject, *Lib.* 5. *de Morb. occult. Cap.* 11. writes, if there were one prince of the whol world, or one conspiracy of many of them against this disease, by the help of physitians this disease might be wholly rooted out; viz. if they who are sick of this dilease, were al committed to physitians to be cured, in the interim were removed from the society of other men, and the same were done with the infected with this disease, as is wont to be with those infected with the plague or leprosie, there were hopes this disease might be extirpated; & for this cause too, because the Veneral disease is not contagious at a distance as the plague is, but for the most part is communicated by copulation, sometimes by kissing and garments. But here is no diligence used, and as the same *Rudius* saith, Theeves, robbers, and murderers, and other wicked persons are sharply punished, but publique whores ful of this disease, and who daily destroy more than a thousand men, & polute whol Families and Cities, are cherisht, smoothed up with flateries, and kept gallantly. But leaving these, let us see what may be foretold of every particular diseased patient.

Prognosticks.

1. The Veneral disease for the most part of it self, is a disease of long continuance, for this reason, Because the liver principally, and the nutritive faculty is infected in it. But *Galen* teaches rightly, 5. *de lo. affect. Cap.* 2. That of diseases of the heart al people die most speedily, of affects of the brain more slowly, but the life is longer protracted when the natural actions are hurt; and though the veneral disease be also malignant, and is not undeservedly reckoned amongst poysons in its kind, yet its power in acting is far slower, than that of other poysons: yet the vehemency or weakness of this poyson in this or that body, and the disposition of the body, may make somewhat to the length or shortness of this disease; for if the poyson be more vehement, the disease is the more dangerous, as shal be said by and by: if also the body before did abound with vitious humors, the evil is

increased,

increased, and made longer: and indeed sometimes the stubbornness of this disease is such, that though it seem sometimes to be wholly extinct, yet it hath been observed that it hath sometimes grown freth againe after many, nay, thirty years, as was said before.

2. But whether this disease wil be hard or easie to cure in any patient, must be judged from the greatness of the disease, and strength of the patient, as in other diseases. First of al, as concerning the nature of the disease it self, though this disease be far more gentle, than other venenate diseases, yet because it is not of the number of them which depend on manifest distempers, but malignant and contagious, it may infect al the humors in the whole body, nay it may pollute al the Similar parts, and hence it is hard to be cured.

3. Yet this disease when 'tis new is easier to cure, than when 'tis inveterate; for in that new malignant quality, it only affects those parts, by which 'tis propagated and for the most part the privities, but in the inveterate disease, that very malignant quality is imprinted also on the liver, and from the liver again is communicated to the blood, and by the blood to al similar parts; for it is false, as appeares out of those things which have been formerly said of the nature of this disease, that the liver here is hurt in sanguification, by no disease, but only by reason of an evil object, which mixt with the blood and other humors, does pollute them, deprave and make them vitious, and convert them into its own nature: indeed 'tis not to be denied, that vitious humors also do corrupt the good, in the interim from good chyle also in a liver evil disposed is generated bad blood, which appears even from this, that through every part the nutrition a little while after is infected through the whol body, which could not be, unless the liver were hurt.

4. *Epiph. Ferdinandus* writes, Hist. 17. That he hath learned by experience, and that other physitians have observed the same, that those who being once cured are again infected with this disease, are either never, or with a great deal of difficulty recovered.

5. Although the nature of this virulency doth not consist in any manifest distemper, yet if it light on a body hot and dry, and especially endewed with a hot distemper of the liver, 'tis more difficultly cured. For whenas pock-wood, Sarsaparilla, and the like, are hot and dry, that hot and dry distemper is increased, and so, though this very disease be not increased, yet another damage is brought upon the body, and whenas those proper medicines cannot safely be administred, unless the body before were very wel purged, by these means 'tis heated and dryed the more.

6. For the same cause, a hot and dry season of the yeare, as that of the summer is, is not so fit for the cure of this disease, whenas the strength is then Exhausted.

7. If also the strength be feeble, that it cannot undergoe those strong medicines which are necessary, or if the sick, out of custom or peevishness, wil not admit of necessary medicaments, 'tis made hard to cure.

8. If also a feaver, or consumption, or other grievous symptom, or disease be joyned, which may hinder the cure, the disease cannot easily be removed, as was said even now, of a hot distemper of the liver, and of the whol body.

9. If there appeare in the joynts, callous, Schirrous, and hard tumors, and those commonly called gummosities, the evil is hard to be cured, and is not rooted out, by most powerful remedies: for such tumors never appear, unless the evil be inveterate, and hath taken deep root, most of which are fixt in the bones under them.

10. Buboes in the groins if they be hard, and are not easily suppurated, and those which sometimes break forth, sometimes vanish, are hard of cure, because they signifie a stubborn matter, and a weakeness of nature in expelling it: but if they be easily suppurated, and the strength be firm, and especially the liver strong, they are ar-

guments of a more benigne Diſeaſe and matter; and ſuch Buboes, if they be kept open along while, may bring perfect health.

11. A roughneſs of the jaws which is attended with hoarſneſs, or an obſcure, or no voice, do ſhew the evil to be antient and ſtubborn, and which wil ſcarce be cured.

12. Ulcers that are new in the Yard are eaſily Cured, but in the Arſehole, or about it, made difficultly, for they ſhew the evil is now inveterate: and ſuch Ulcers are continually moiſtned by the Excrements, and Medicines cannot conveniently enough be applied to them.

13. Ulcers alſo in the joynts and other parts are moſt hard to cure, becauſe they ſignifie an evil now inveterate, and which hath invaded the whole body.

14. Ulcers in the mouth and jaws are not eaſily cured, becauſe alſo they argue the evil to be ancient, neither can convenient Medicines be applied to them, and they are continually moiſtned, by the Excrements falling from the brain.

15. If the bones of the noſe be eaten, and there be alſo a ſlow Feaver, it ſignifies an evil incurable, whenas now the diſeaſe is communicated to the brain it ſelf, or its Membranes.

16. Bunchings out in this diſeaſe, eſpecially the broader, are not eaſily cured, and they argue an evil hard to be cured.

17. The colour of the Skin depraved, and the falling of the hair, if convenient means be applied, are not very hard to cure.

18. Pains eſpecially in the Head, and upon the Shins, are oftentimes very ſtubborn, that they yeild to no Remedies, or at leaſt not under a long time.

19. Vertigoes and falling ſickneſſes are moſt grievous and pertinacious, for they ſhew that the Veneral Virulency, hath now poſſeſt the brain it ſelf.

20. Diſtillations alſo are laſting, becauſe they alſo happen, only when the evil is inveterate, and the brain is affected; the which are more dangerous and grievous, if they fal on the breaſt and Lungs, and exulcerate them.

21. Alſo the noiſe in the Ears is for the moſt part laſting, and ſcarcely removed, whenas there are divers windings in the Eares, and their expulſive faculty is weak, neither can medicines penetrate thither.

22. The running of the Reins alſo for the moſt part is laſting, or if it be ſtopt grievous evils are wont to follow, and moſt heavy pains of the Head and Joynts.

23. But chiefly the Nature of the Contagion it ſelf, from which the ſick contracted the diſeaſe, doth manifeſt the force and greatneſs of the diſeaſe; for this poyſon hath ſomtimes a greater, ſomtimes a leſs activity, and Phyſitians do relate who have often had ſuch Patients in cure, that ſomtimes of ten ſtrong yong men, who have had to do with the ſame Whore, not one of them hath ſcaped, therefore if it be known, from what he or ſhe, this evil was contracted, the Phyſitian may the eaſier judg of the event of the diſeaſe.

24. Other things being alike, this evil is eaſieſt cured, which is contracted by Whoriſh Copulation, but that is harder to Cure, which the Infant hath ſucked in with the milk, whenas the virulency goes into the ſtomach with the milk, and hence in the Liver there is generated a virulent blood, which afterwards runs through the whol body, and Pollutes that. But the Hereditary evil is hardeſt of al to Cure, and that which is communicated from infected Parents, with the Seed and blood.

25. As for the parts affected, if the Liver only be affected, the evil is the eaſier Cured, whenas it hath a ſtrong expulſive faculty, and Medicaments can eaſily penetrate unto it: but the Spleen, Kidneys, Womb, and external joynts are not ſo eaſily Cured, but hardeſt of all the Brain, and the Lungs, becauſe they have a weaker expulſive faculty, and Medicaments do not eaſily penetrate thither.

26. From al which 'tis eaſily collected, what wil be the event of the Diſeaſe, for

by

by how much the more, and more grievous diſeaſes and Symptomes are joyned with the Veneral diſeaſe, by ſo much the more the ſick are indangered; by how much the fewer, and lighter, by ſo much the leſs: and thoſe chiefly die, who to their putrid and Malignant Veneral Diſeaſe, have ſupervenient thoſe Feavers they call Gallical; for the Veneral Virulency whiles it corrupts the Humors, and induceth a Malignant quality into them, makes the Feaver worſe, and alſo debilicates the innate heat, whence neither the Feaver, nor that Malignant diſeaſe can be overcome by Nature.

27. Very many alſo die of a waſting of the body, and a hectick Feaver, or rather a ſlow, and putrid one: for both the Veneral virulency it ſelf, and the pains, watchings, and other ſymptomes do debilitate the innate heat, hurt nutrition, whence follows a waſting of the whol body, to which is joyned a ſlow putrid Feaver raiſed from the evil Humors.

28. Sanguification alſo being hurt, ſome die of a Dropſie.

29. Many alſo die by reaſon of Catarrhes, falling down on the jaws and Lungs, hindering and taking away their breath; or the Veſſels of the Lungs being eaten by a ſharp Catarrhe, and firſt of al ſpitting of blood being raiſed, then a Phthiſick, they die.

30. Somtimes the Veſſels being eaten in two by the acrimony of the Humors, and Vomiting of blood cauſed, the ſick die by too great a Flux to the ſtool, or by the Womb.

CHAP. VIII.

Of Prevention.

Prevention

WHenas 'tis ſafer to prevent a Diſeaſe, than to cure it, ſome Phyſitians endeavor to teach, by what means one may keep himſelf clear, though he have had to do with an infected Woman. Of which buſineſs *Fallopius* treats in the whol Chapter, 89. *de Morb. Galli.* and he writes that he ſhould ſeem to have done nothing unleſs he teach, how one ſeeing a handſome Woman, and lying with her though ſhe be infected, may be preſerved from the French Diſeaſe: and he cals the immortal God to witneſs, that he hath made tryal of it in ten thouſand men, and none of them was infected: and he propounds there two medicaments, by which the Contagion received may preſently be drawn forth, diſſipated, or dryed up. *Hercules Saxonia*, propounds the ſame, *de lue Vener. cap.* 16. and does very much commend them, and as *Aurelius Minadous* ſpeaks of this buſineſs, many confide that being guarded with thoſe Medicines as with a buckler, they may enter the moſt infected whores, and freely ramble al the world over. *Euſtachius Rudius*, alſo propoſes the like Medicaments, *Lib.* 5. *de morb. occult. cap.* 13. But indeed I do not beleeve, that thoſe things can be taught with a good conſcience, by which ſo many men are encouraged to luſt, whom perhaps the fear of this Diſeaſe might have frighted from it; and therefore we wil ſay nothing of theſe Medicines; but *Aurelius Minadous* thinks they themſelves are deceived, that teach ſuch things, *Cap.* 31. *de Virulentia Venerea.* Where he overthrows *Fallopius* foundation, who thinks that this Diſeaſe is only communicated by the leaſt purulent bodies, which if they be wiped away, extracted, diſſipated, this Diſeaſe may be turned off, and he teacheth that the Contagion doth not only enter by the external parts of the Privities, but alſo chiefly by the internal, and runs through the Body, and that the infected Vapors, and ſpirits do paſs through the internal poroſities, and are admitted by the Veins; and therefore no man can promiſe himſelf health and ſafety from waſhing, which only reaches to the external parts, nor from other Medicaments outwardly applied, neither can ſuch external Medicaments take away the Pollution conceived within. The ſafeſt way therefore to avoid this Diſeaſe is to abſtain from whores, and to

remember that Whoremongers and Adulterers the Lord wil judg, who yet is wont alſo to puniſh them in this Life, with that moſt filthy Diſeaſe.

Yet *Jul. Galmarius*, hath another way of prevention of this Diſeaſe, to wit, by internal Medicaments, and he writes that he hath found out an antidote or a Mullet, by the uſe of which mens bodies are rendered ſafe againſt this Diſeaſe, yet he entreats and conjures al Phyſitians and Chyrurgeons, that they do not communicate and make known that Medicine in obedience to luſtful people, and that they make not themſelves foſterers of luſts, but to them only who muſt neceſſarily converſe with thoſe that are ſuſpected or defiled. But he deſcribes that Antidote, *Lib. 1. cap.* 8. and this is it.

Take *of the Amulet for the Pox, and of old Mithridate, by* Galens *deſcription, of each ſix drams; Conſerve of the flowers of Bugloſs, of broom, of Roſemany, of each three drams; mix them, give one dram, or a dram and an half, or two drams at the moſt, in the morning two hours before meat, eight or ten daies together.*

But if any one ſuſpect himſelf to be infected, he admoniſheth that he earneſtly uſe a greater care for prevention: therefore let him take of the Alexipharmacal Medicine even now deſcribed, ſwallowing a dram, or a dram and an half in the morning and before ſupper, for eight or ten daies together, whoſe Vertue that it may reach the eaſier to the more remote parts, when they have ſwallowed it, 'tis expedient they drink preſently after it ſomwhat of this Julep, by which as its vehicle it may be carried into every part.

Take *of the water of bleſſed thiſtle, burnet, Devils-bit, of each two ounces, of Syrup of the juyce of Sorrel, of Lemmons, of each an ounce and an half. Make a Julep for two doſes, to be drank preſently after the taking of a dram and an half of the Amulet, in the morning, and two hours before ſupper.*

But whenas al thoſe ſimple Medicaments, which are in that Antidote, are not proper to this Veneral Diſeaſe, we muſt conſult with experience, whether their vertue be ſo great, as *Palmarius* cries it up for.

CHAP. IX.

Of Indications.

Indications THoſe Indications which are in other diſeaſes, are found alſo in this; to wit, That which is taken from the Diſeaſe, called in ſpecy Curative: That which the cauſe doth afford, Preſervatory, whether alſo are referred urgent Symptomes; and laſt of al the Vital, for they deſervedly challenge a place in this diſeaſe, yet in the explaining of them Authors vary much, and as every one thinks of the Nature of this Diſeaſe, ſo alſo he teacheth concerning its indication and cure. We inſiſting on thoſe things which we have formerly prepoſed of the Nature of this Diſeaſe, and have ſtrongly proved, think thus of indications in this Diſeaſe.

Firſt of al, whenas this Diſeaſe is occult, and Malignant, chief enemy to the Liver and nutritive faculty, therefore it affords a kind of genercial indication, but no ſpecifical and profitable one can be had from thence, and therefore only experience, which hath found out Medicines working by an occult quality, hath adminiſtred profitable Medicines in this Diſeaſe: and unleſs the Spaniards had received from the Indians ſuch Medicaments, as Lignum Sanctum, Sarſaparilla, China Root; and the boldneſs of Chyrurgions, and eſpecially *Jacob Carpus*, had not fallen upon the uſe of Mercury, either by chance or by argumentation, whiles they read that *Avicen*, *Meſue*, and *Theodoricus*, made uſe of quickſilver, in certain puſtles, and a cruſty Scab, perhaps even to this day the true Remedies of this Diſeaſe would lie hid. But though the Remedies of this diſeaſe, were not found out ſo much by indication, as by experience; yet a Method in curing of it is not wholly excluded, but hath its

place

place also, whenas 'tis necessary that those Medicaments found out by experience be rightly applied; and besides also Tumors, Ulcers, and the like Diseases springing from the corruption of Humors, have their Method, by which they are cured. Yet in this case we must have a care, that we do not look more on the manifest qualities, and known diseases, than on the occult Nature of the disease, in which business notwithstanding many do fail, who are tedious in curing of divers distempers, preparing the Humors, and directing their cure to these or those diseases. Whenas yet 'tis plain by experience, that in a hot, and in a dry distemper, and in an exustion of the Humors, as they speak, and in a Consumption it self, we do most happily use pockwood, and the like hot and dry things, and the Malignity being overcome, the rest do easily vanish.

Secondly, as concerning indication preservatory, here we must chiefly have respect unto that Malignity and virulency imprinted on the Humors, and that is to be destroyed by proper and Alexipharmacal Medicines. Yet if there be any other faults in the Humors, it wil not be unprofitable also to mend them. And whenas the body is either burthened with a Plenitude, or abounds with vitious Humors, the malignity is the easier disseminated into it, and there is more plentiful matter prepared for putrefaction, and the force of the Alexipharmacal means is dulled, it is expedient to empty either the superfluous blood, or the vitious Humors, that the other Medicines afterwards may be administred more safely, more commodiously, and with greater benefit. *Preservatory.*

Thirdly, the Disease and various Symptomes, which supervene to the principal disease, and arise from the corruption of Humors, are al to be removed in their proper manner. *Curative.*

Fourthly, the strength is to be preserved, for as no other disease can be cured, unless there be strength of body, so nor this; and al attempts are in vain, unless at leastwise we have Nature willing. *Vital.*

And so there are four things chiefly to be done in this disease: First of al, if blood abound, that must be diminisht, and if any vitious Humors abound, they are to be prepared and emptied, and if there be any manifest diseases, which may be an impediment to the proper Cure, as obstructions and the like, they must first of all be taken away. Secondly, the Malignity and virulency as wel that inherent in the humors, as that imprinted on the parts, and principally the Liver, is to be destroied by the proper Alexipharmaca of this disease. Thirdly, the strength is to be preserved and confirmed, and first of al chiefe care is to be had of the Liver, which suffers in this disease. Fourthly, the diseases and Symptomes which are wont to be joyned to this disease are to be taken away. *Four things to be done in the Cure of the Veneral disease.*

Here we must clear a controversie, to wit, Whether this disease may be cured without sweating? Some are of this opinion, That this disease may be taken away, though sweat be not provoked: And first of al they prove it thus, Because this evil consists in a certain hidden quality which cannot be taken away but by alteration of the body, whenas contraries are cured by contraries: but that alteration may be affected by the proper vertue of antidotes and decoctions administred, without sweating. Next of al they alledge experience, by which it is evident, that by the taking of such Medicaments, some have recovered without sweating. Thirdly, they urge this, That those that drink the decoction of the wood are somtimes happily emptied by nature, by urine, by the stool, and not alwaies by sweats. *Whether the cure may be perfected without sweating.*

Aurelius Minadous, contends against these, *de Virulen. Vener. Cap.* 39. And first of al he writes that he never observed, that Physitians commanded the decoction to be taken without sweating, to which al Alexipharmacal things of their own Nature do incline men, neither is the matter it self unfit to be expeld this way, being Vaporous and halituous: neither was there ever any one, who did throughly and wholly overcome this disease without the help of some sweating, especially if it were inveterate; but why he holds thus, he brings this reason, That in his opinion, the essence of this evil doth not consist in a quality, but in the body

affected

affected with an evil quality: and therefore he holds, as a quality doth indicate alteration, so a body indicates Evacuation, which though it may be many waies, yet most commodiously by sweating: whenas this very thing is a Vaporous body, and is most rightly and easily discussed by sweat; and he adds this, whenas there is a great quantity of Excrements abounding in those bodies infected with this disease, not only in one part, but al over the body; but sweat is an universal Evacuation, they are most commodiously emptied by sweating: and he holds that sweats do very much profit the Liver especially. For whenas that is the Forge of Humors, which are carried through the whol body, and they are purged by the benefit of sweat, and freed from al defilements, also the Liver polluted may be this way cleansed, and though Nature somtimes do empty the virulent humors by some other part, as by stool, or by Urine, and then her endeavor is not to be hindered, but to be helped forward; yet he holds that without sweating the whol body cannot be freed from that Disease, and he thinks that sweat only can empty from al places both internal, and external, quickly, safely, and pleasantly.

The decision But neither of these opinions doth fully reach the Truth, and both delivers an imperfect Cure. For whenas the Curative indication so called in general, is twofold; the one preservative, which is taken from the cause; the other in specy called Curative, which is taken from the Disease; they who think this disease may be cured without sweat, because it consists in a certain hidden and Malignant quality, think right concerning the curative indication, whenas that malignant quality cannot be taken away by sweating, or other Evacuations, but by proper Alexipharmaca, yet they neglect the preservative indication, and the cause: for whenas it is certain, that in the Veneral disease, there is not only a vitious disposition, and Malignant, in the parts, especially the Liver, but that al the Humors of the Body are corrupted; there is required then an Evacuation of them, which is most commodiously done by sweating, as *Minadous* rightly proves. For though something be discussed insensibly, yet that insensible Evacuation is not sufficient, and 'tis too slow. But *Aurelius Minadous*, thinks wel concerning the taking away of the Cause, and the Evacuation of vitious Humors, which is most rightly done by sweating; but he neglects the disease it self, or that Malignant quality, imprinted not only on the Humors, but also on the Living parts: from which it appears, which is diligently to be taken notice of, that the dispute of occult diseases, is not amongst those which *Galen* calls Logical, but does conceive the very essence of these diseases, and that the ignorance of the occult diseases, doth not only breed Errors in theory, but also in practice. Therefore though we do grant, that the Evacuation of Humors is wel ordered by sweating, yet Alexipharmaca are necessary also, against that malignant disposition in the parts, especially in the Liver, and *Fernelius*, whom *Palmarius* follows, for this very cause do add peculiar Alexipharmaca, as shal be said, that that Malignant disposition may be pulled up by the Roots. For though al the vitious Humors be emptied, and al other diseases and Symptomes do cease after their emptying; yet unless that Malignant disposition be taken out of the parts, the evil grows fresh again, and oftentimes a long while after. And this I think is the cause, that not only the decoction of Pockwood, Sarsaparilla, and the like, is given in the morning to provoke sweat, but also without sweating is taken as common drink; for the very same proper Medicines, which do destroy the occult cause and malignity in the humors, and do empty the vitious humors by sweat, are able also to Eradicate the disposition imprinted in the parts.

Last, of al this must not be past over, that the indications proposed before, are not necessary to be observed in every French disease, but only in that, which hath almost invaded the whol body, and especially hath possessed the Liver. But if the evil be new, there is no need either to let blood, or to give purges, whenas the fault is not yet communicated to the humors, but it is enough to wipe off, or cal forth the contagion received, which also is sufficient in the scab newly contracted by contagion, where yet we must observe, whether those pustles, and French rottenness, as

they

they cal it, do immediately proceed from contagion, and whoriſh copulation, for then external medicines do ſuffice, or whether they do ariſe from the Liver now affected, for then there is need of evacuations and alexipharmaca.

Chap. X.

Of the Cure. And firſt of bleeding.

FIrſt of al therefore as concerning indication preſervative, or the removing of the cauſes, and bleeding at the beginning; truly the cauſe of this diſeaſe properly and next of al is not taken away by letting of blood; yet if blood do abound in the body, and that eſpecially be too hot, the proper remedies of this diſeaſe, which are hot and dry, cannot be ſafely adminiſtred unleſs the abounding blood be firſt diminiſhed.

And truly if the virulent matter have no peculiar motion to any part, the baſilick veine may firſt of al be opened: but if the matter have motion to ſome particular part, as to the groin, and nature thruſt forth a bubo, bleeding is warily to be uſed: for if the bubo tend to ſuppuration, we muſt not let blood, and eſpecially in the Arme, leſt nature be troubled in her expulſion, and the matter be recalled to the inward parts. And it hath been obſerved, that many from the bubo opened, and the matter a long while emptied by it, have become perfectly ſound; on the contrary from unſeaſonable bleeding, the evil hath been prolonged; therefore in bleeding we muſt attend the motion of nature, and when the tumor doth not afford hopes of ſuppuration, a veine muſt be opened in the lower parts, for ſo the the matter is retracted towards the lower parts, and by reaſon of the efflux of hot blood, 'tis afterwards more eaſily ſuppurated. After the ſame manner a veine is to be opened in the yard, if there be rottenneſs in the privities, or a running of the Reines, and wholly if the parts below the Liver be affected: but if the matter ruſh to the head, and there cauſe moſt vehement pains, filthy ulcers, falling of the haire, the cephalick veine in the Arme is moſt commonly opened.

The other precepts which are propounded in general concerning the right adminiſtration in bleeding, are here alſo to be obſerved; which whenas they are not proper to this affect, we ſhal no further propoſe them here.

If the ſtrength wil not beare bleeding, inſtead thereof the hemorhoidal veines of the Arſe, may be opened, or Cupping-glaſſes be applied in convenient places.

Chap. XI

Of the preparation, and purging of vitious humors.

Preparation and purging of humors.

NExt of al if the body be cacochymical, the vitious humors muſt be emptied and prepared with convenient medicaments; whenas in an impure body alexipharmacal meanes, and proper remedies of this diſeaſe, do profit little, nay they may bring hurt, and though that diſeaſe be overcome, may render the body obnoxious to other diſeaſes. For vitious humors collected about the bowels cannot al be diſcuſſed and diſſipated by ſwear, but the thinner part being diſcuſſed the thicker is left, and grows dry, and is faſtened in the bowels, and oftentimes contracting an acrimony, doth weaken the ſubſtance of the veſſels: from whence that diſeaſe grows ſomtimes more ſtubborn to cure, and there ariſe obſtructions of the Liver and Spleen, and ſchirrous tumors, hypochondriacal diſeaſes, and creeping ulcers.

Nor yet is purging only to be uſed in the beginning, and before the proper cure of the diſeaſe, but alſo the whol time of the cure, if vitious matter be collected again,

'tis

'tis to be emptied by intervals: yet if the evil be now inveterate, and ſtick principally in the external parts, the vitious matter is not rathly to be recalled to the inward parts by ſtrong purgers, leaſt the Liver, Stomach, and other bowels be hurt and weakned, but 'tis to be emptied by convenient places, where nature tends.

But concerning the preparation and purging of humors, though many Authors are large enough, yet whenas thoſe things which are ſpoke by them, concerning an univerſal preparation and purging of humors, are not proper to this diſeaſe, but are common to al depending on a cacochymy: it ſeems not worth our labor, to dwel upon thoſe generals, which are already known by the cure of many other diſeaſes. We ſhal only admoniſh you of theſe things; firſt of al when the diſeaſe is new, we muſt obſerve, what vitious humors abound in the body, and eſpecially in the ſecond region, and thoſe muſt be prepared and emptied. But if the evil be now inveterate, becauſe in that for the moſt part, thick and aduſt humors are collected, the medicins are firſt of al to be directed againſt them. Next of al this is to be obſerved, that we have reſpect alſo to the diſtemper of the bowels, and if they have contracted any diſtemper, that muſt be corrected, and they muſt be ſtrengthened with proper medicaments. Thirdly, it is neceſſary, that we alwaies ad ſomwhat to our preparatives and purgers, which doth reſiſt the Veneral virulency by a ſpecifick faculty; and therefore concerning common purging medicines we wil ad nothing, whenas they are every where obvious and known, but this that many phyſitians do teſtify, That Mechoacan, to which belongs Jallop, is given not only for its purging faculty with benefit in this diſeaſe, but alſo becauſe 'tis an enemy to this evil by a peculiar power, ſo that it is numbered by ſome amongſt the antidotes of this diſeaſe. Then by the Chymiſts mercury prepared is chiefly commended for the curing and purging of this diſeaſe, of which ſhal be ſpoken hereafter in particular.

Chap. XII.

Of the proper remedies and antidotes and alexipharmaca of the Veneral Diſeaſe in general.

AFter the body is emptied in convenient manner, the greateſt hopes of this cure is in the proper antidotes of this diſeaſe, as from which only perfect health can be hoped for ſo indeed, that though divers other diſeaſes, ariſing from the corruption of humors, be often joined with this diſeaſe; yet if that malignity be taken away, a little while after either they vaniſh of their own accord, or are eaſily cured, but without the help of theſe remedies, no perfect cure can be hoped for by other medicines, under what name ſoever: and this too is obſerved by many that theſe kind of medicaments though by their manifeſt qualities they ſeem to be adverſaries to a hot and dry diſtemper, yet theſe hot and dry medicaments have been uſed with moſt happy ſucceſs by many who were endewed with a hot and dry diſtemper of the Liver, nay of the whol body, and who had a leane habit of body, nay were almoſt plainly conſumptive, from which very thing appeares, that in this diſeaſe, we ought rather to take care of the occult malignity, than of the manifeſt diſtemper. And therefore as ſoon as the body is in ſome ſort prepared and emptied, we muſt maturely haſten to thoſe Alexipharmaca of the Veneral diſeaſe.

Alexipharmaca of the Veneral diſeaſe are neceſſary.

But though ſome Phyſitians would advance and extol the vertues of thoſe medicaments which ſhal preſently be reckoned up, whiles they hold, that the decoction of Juniper wood, of the Olive tree, Box, Beech, and other trees may performe the ſame, as the decoction of Guajacum, ſo that a moſt ſlender courſe of dyet be uſed, as is wont to be obſerved with the decoction of Pock-wood: yet experience hath long ſince taught that that is falſe: for though it be certain that by a moſt ſlender diet ſome ſymptomes of this diſeaſe do grow more gentle, yet unleſs proper remedies be adminiſtred, a little while after the diſeaſe is ſeen to grow freſh again, and

returne

return more cruel: for such medicines indeed with a slender diet, may consume the vitious humors, but they cannot overcome the malignity: as therefore this disease is occult, and is not known but by its effects, so also the remedies which cure this disease, are not found out by reason, but only by experience.

What they are.

But what those medicaments are, Physitians again do not fully agree. Many put their greatest hopes in Quicksilver, and think that the only and proper Alexipharmacum of the Veneral disease; others do wholy reject it, of which business shal be spoke hereafter. Others, and most men indeed, undertake the cure of this disease with the use of Guajacum, Sarsaparilla, China root, Sassafras wood; and others doubt of these very things, nay some deny that this disease can be overcome by the use of Guajacum only and the like, and therefore they think their vertue ought to be quickned and increased by the mixture of other things. *Jul. Palmarius lib. de lue Vener. cap.* 13. distinguisheth and thinks that Guajacum is not of so great force that that alone can wholy extinguish the root, and al the deadlines of the veneral poyson; neither that it is so weak, that it can do nothing without the help and conjunction of other things; he writes indeed that by the use of that alone, the humors being consumed, al the symptomes of the disease wil at length be allaied, and wholly lie hid, but yet the virulent taint of the disease, which is already in the solid parts, is not overcome, and wholy extinguished in most people by that remedy; but that the deadliness of the latent poyson be wholy extinguisht, and that the return of the disease be prevented, he thinks other alexipharmaca ought to be administred, which opinion doubtless he received from his Master *Fernelius*, for he writes that he, as in *lib.* 1. *de. lue Vener. cap.* 7. did first dare to promise a perfect cure of the French Disease without the use of Quick-silver, and that he took care for the Composition of many Alexipharmaca at his House, which he gave against this poyson with Guajacum, and sometimes without it, and as he writes in the alleaged *Cap.* 7. two of these medicines which he found to be most excellent and efficacious, he by the addition of other medicines hath reduced into one, which hitherto never failed any man.

But whenas these medicaments are compounded of common Alexpharmaca not proper to this disease, we shal not propose them in the first place, but hereafter we shal speak somwhat of them. But in the first place, we shal treat of those things which most Physitians have hitherto used, and which long experience hath now confirmed to be alexipharmaca of this disease, by the use of which it hath been a long time observed, that not only the vitious humors have been emptied, and the symptomes destroyed; but the very roots of the disease have been pulled up, that it could no more returne. Of which sort are your pock-wood, sarsaparilla, China root, Sassafras-wood, of which we wil now speak.

Chap. *XIII.*

Of the Indian Wood, and Guajacum.

The Indian wood.

AND first of al we wil treat of the Indian wood, as being that which challengeth the cheife place amongst the remedies of this disease. For whenas this disease is reported to be endemious in the *Indies*, the chiefe remedy is also fetcht from thence, which they cal the Indian wood; but this sort of wood, as appeares by *Consalvus Oviedus* a noble Spaniard, who writes of things in the *Indies*, is two fold; the one which is commonly known, called Guajacum, the other which is called the holy wood. For though by many these two woods are taken for one and the same, yet the forementioned Author, doth distinguish them both by their marks and places, concerning which see *Fallopius de morb. Gal. cap.* 39. yet whenas both woods have the same force to overcome the French disease, (though it be reported that the holy wood be of greater force against articular diseases, and others, and the holy wood is now a days seldom brought over to us) we shal only speak of Guajacum.

Two fold. Guajacum.

The holy wood.

Amongſt other new Iſlands found out in former Ages, there is one alſo, which the Spaniards the diſcoverers have called by the name of *Hiſpaniola*: whenas the Veneral diſeaſe was reported to be indemious there, and the decoction of a certain wood is eſteemed there the only remedy of that diſeaſe, which at this day is called guajacum, & by the inhabitants is pronounced with gaping Huajacum. The Spaniards infected with the ſame diſeaſe, having found the ſame decoction to be helpful, did afterwards diſcover its vertue to others: the tree is reported to be leaved like aſh, the color of the wood within is blackiſh, the wood it ſelf is heavy and ponderous, it floates not in water, but ſinks; 'tis ful of rozin, and while it burnes, it ſends forth no ingrateful ſcent, its taſt is ſomewhat bitter, with a light accrimony, pricking the tongue.

The Choice of Guajacum.

There is ſome doubt amongſt phyſitians concerning the choice of it; ſome are of opinion, that which is whitiſh, is to be preferred before the reſt; whenas by how much the leſſer 'tis in years, by ſo much the whiter it is, but the older it is, by ſo much the blacker it is: but that which is older is dryer, and that which is yonger is more moiſt, and more abounding with juyce, and therefore more powerful. But indeed whenas there is a two fould humor in living things, the one primogenious, the ſubject of innate heate, or the implanted ſpirit, apt to take fire; the other alimentary, more watriſh, and leſs apt to be ſet on fire: the vertues of this wood, as alſo of other plants, are not to be judged from the alimentary and more watriſh humor, but from that implanted heat, and primogenious humidity; which whenas in 'its tender age, both in infants, and in plants, 'tis overwhelmed and obſcured by much moiſture, many actions in that age are infirm and weak, which afterwards that moiſture being ſomewhat waſted, and the heat become more vigorous, in progreſs of time they become more ſtrong, and this heat the cheif inſtrument of al actions is wont to conſiſt unchanged til it comes to its ful age, and heigth: and therefore though the ſame innate heat and radical moiſture be alwaies in Guajacum, on which its vertues do depend, yet becauſe in the yong and tender wood, that vertue is as it were over whelmed, and reſtrained by the abundance of moiſture, that wood which is the yonger is leſs efficacious, than that which is now of a ful confirmed growth: and therefore for the cure of this diſeaſe, we muſt not chuſe that wood which is yellowiſh, or that is of a box colour, or that which is cut of a tree not ful grown, or from the boughs, as being leſs efficacious; but rather that which is ſomewhat black, becauſe that is more roziny, and abounds with that fat and balſomy ſubſtance, in which doth chiefly reſide that vertue oppoſite to veneral virulency. It is good therefore to know the age of this wood, that we may chooſe the moſt effectual. For that indeed which hath the inward part black, and is long waies divided with clefts as it were with certain lines of a duskiſh colour, gathered into blackiſh rounds, that is efficacious, but yet 'tis ſuch as is cut off either from the arms of trees, or certainly hath not yet attained its ful maturity, and therefore 'tis of leſs efficacy: for thoſe kind of Lines do therefore appeare becauſe that fatty ſubſtance, which doth chiefly reſide in the middle trunk of the tree, is not yet ſo plentiful, as to fil up al the internal parts of the wood: but that which is black al over the internal parts, the ſuperficies only being whitiſh, that if it be ſound, weighty, and odorous, and prick the tongue with a light acrimony, and either is not divided with any lines, or elſe with thoſe ful of rozin, and therefore while it burnes beſides the grateful ſmel it ſends forth, it alſo yeelds a blackiſh rozin that hath attained the higheſt degree of maturity, and is cut off from the body of the tree, and is therfore moſt effectual, but if it be divided with lines, and ful of holes, and neither weighty, nor odorous, nor acrimonious, and being lighted yeelds no rozin, it is a ſign that that is now old, and therefore its vertues are grown dul.

How the age of this wood is to be diſcerned

L. Septalius alſo doth admoniſh us here, that there is a certain ſort of Guajacum, which is never to be brought into uſe, which hath no true blackneſs in the middle of it, but is of a ſomewhat darke and greeniſh colour, which makes the decoction very thick, that it wil never be cleare, and by its exceeding acrimony, it cauſeth a heat both

both in the throat and jaws, and by reaſon of its thick and earthy parts, for the moſt part it cauſeth obſtructions in the ſpleen, ſometimes alſo in the liver, Empiricks cal it the wild holy wood: but whereas he finds no where in Authors this twofould difference of domeſtick, and wild; he rather thinks it acquires theſe qualities from the nature of the ſoil.

Alſo if the barke be thick, and cleave ſo to the wood, that it can ſcarce be pulled and parted from it, the wood is good: but if the Bark be eaſily ſeparated from the wood, either 'tis old, or periſht by ſalt water: alſo if the wood appear fatty whiles it is raſped, and that being maſticated doth bite, and leave a bitterneſs behind it; and whiles it is cut, it appeare ſolid with an even ſuperficies, not rough and ful of holes, the wood is good.

The bark of Guajacum.

The Bark of this wood is endewed with great acrimony and bitterneſs, and therefore dries, attenuates, and digeſts more powerfully than the wood; but becauſe that occult vertue which is oppoſite to this diſeaſe, is rather in that fatty and moiſt, and balſamical ſubſtance, the wood is alwaies preferred before the bark; and beſides the bark is not ſo conveniently given in hot and dry bodies.

The vertues of Guajacum.

As concerning the vertues of Guajacum, it is hot and dry, as may be perceived from its taſt, ſmel, and acrimony, and that in the ſecond degree, and 'tis alſo of thin parts, whence it hath power to attenuate craſs things, to cut and cleanſe clammy humors, to open obſtructions, to move ſweat and urine, and to diſſipate and waſt ſuperfluous cold humors: but this pockwood is not chiefly given for thoſe qualities (whenas there are found in *Europe* medicaments endewed with thoſe qualities, that there was no need to tranſport them out of the *Indies*) but principally for that peculiar and occult power. By which it is oppoſed to the Veneral virulency: and truly al phyſitians almoſt doe agree that pockwood doth deſerve the firſt place amongſt the alexipharmaca of the veneral diſeaſe: for though *Fernelius* would ſomewhat leſſen its vertue, becauſe al that are affected with this diſeaſe are not cured by the uſe of it, yet this is no ſufficient cauſe, ſince there is found no ſuch alexipharmacum, or other medicine which can cure diſeaſes paſt hope. But this wood is by an occult quality and propriety oppoſite to the Veneral virulency it ſelf, and is a friend to the radical moiſture, and natural baſſom, which doth moſt of al ſuffer by this virulency inimicous to the nutritive faculty; and doth ſo ſtrengthen it, that it hath been obſerved, that thoſe alſo, who had a liver, and whol habit of body hot and dry, and who have been almoſt conſumed with the veneral diſeaſe, as was ſaid before, by the uſe of the decoction of this wood, though by its heat and dryneſs adverſe to them have been reſtored, and become better habited and more corpulent. Some indeed have dared to write, that the decoction of this wood doth nouriſh as much as chicken broath: but theſe ſeem to me, to be exceſſive in the praiſe of this wood: for though it be a vegetable, and perhaps may leave ſome alimental juyce in the decoction, yet I think no body that is in his right mind wil eaſily deny, that a chicken hath not more convenient nouriſhment for a man, than Guajacum, but that ſome after this diſeaſe become more corpulent, is accidental; for whenas by reaſon of the Veneral virulency nutrition was hurt in the whol body, when that is diſcuſſed and extinguiſht, the body begins again to be nouriſht wel, and to be augmented: the like of which happens alſo in ſome other diſeaſes, eſpecially in feavers, before which whenas men were not wel fleſht by reaſon of evil nouriſhment, the vitious humors being waiſted by the diſeaſe afterwards they begin to be nouriſht wel, and become more corpulent.

Whether pock-wood do nouriſh.

Fr. Arcæus alſo *lib. de curand. vulner. rat.* gives the † Decoction of Guajacum for ulcers of the Lungs, and the ptiſick; and he writes, that bodies, though they be waſted, are not offended by it, but rather grow fat upon it: nay there are ſome, who attribute a nutritive power to Guajacum, and write that it is no leſs nouriſhing than chicken broath. The ſame vertues alſo others do attribute,* to Sarſaparilla, Saſſafras, and eſpecially to China root, but indeed though it be found by experience, that in the

† *Whether the decoction of Guajacum, ſarſaparilla, ſaſſafras China root, do fatten.*

* *The decoction of Guajacum, Sarſa, Saſſafras, China root, nouriſh not but by accident.*

the ptisick, Veneral disease, scab and other diseases, bodies extenuated, have been restored again, and made fat by the use of these decoctions, yet this comes to pass not of it self, because these decoctions have a nutritive faculty, as other nourishments, but by accident, in as much as they take away the cause of leanness. In ptisick bodies the case is plain; for whenas that wasting of the body proceeds from an ulcer of the Lungs, the ulcer being dried up by the use of Guajacum, the body begins to be wel nourisht again: the same happens in other diseases, as the French, the Scab, and the like. For whenas that leanness, and consumption doth proceed from bad nourishment, but bad nourishment for the most part from acrid and salt humors, which do both consume the good blood, and hinder the agglutination of it to the body, those vitious humors being wasted by the decoctions, and discussed by sweats, the bodies begin to be nourisht wel again, nay grow fat.

But this wood hath not only an alterative power, and by its occult quality to extinguish that malignity of the Veneral virulency, imprinted both on the humors, and the solid parts, but also to evacuate, both sensibly by sweating, and insensibly by insensible transpiration: and therefore the way of curing the French disease by Guajacum, and medicines of affinity with that is most in use. For though by reason of the length of the cure, and the pains of sweating, and the slender dyet, it cause some trouble to them: yet it is far safer than that way, which is by quicksilver, where if there be an error, the patient is in no smal danger.

Medicines made out of Guajacum.

But there are prepared out of Guajacum divers medicaments, and those either in a liquid forme, or in a solid, and in substance: but those given in a liquid forme, are most effectual, whenas they are easily deduced into act and penetrate into the whol body, and do irritae the expulsive faculty of al parts to cast off what is hurtful: but in a solid forme, whenas that part in which the vertue of the medicine doth cheifly reside, is not yet separated from the earthy and thick part, 'tis not so easily deduced into act. The decoction therefore as most convenient is most in use: yet if any by reason of the continued use of this medicine be weary of it, and nevertheless do feare least there be some reliques of the evil humor remaining, or their course of life wil no longer admit of the use of the decoction as it ought to be taken, to such, medicines made out of this wood, may be given in another form. Amongst which extracts and spirits, as shal be said, are most efficacious, and far more excellent than pouders.

The manner of preparing a decoction of the wood.

But the manner of boyling this wood is various, both in respect of the liquor in which the decoction is made, and of the quality of the liquor: for some boyl the wood in water, some in Barly water, some in distilled waters, others in wine, others in Whey, and others in broth of Flesh. *L. Septalius lib. 7. adnimadversionum.* 204. reprehends those who deny, that the decoction of this wood may be made in wine only, when as nothing is more fit to extract the faculties of medicines, than wine, and the water of wine (he had spoke righter than the spirit of wine) and therefore he prepares his decoction with wine, which he useth when the disease is inveterate with an evil habit of body, and a cold matter predominant: after this manner eight ounces of the bark of the best holy wood grossely poudered being infused in forty two physical pints of the best white wine, for two days, the wine being first heated and alwaies kept hot those two days in a double vessel, or in the ashes; afterwards with a slow fire boyl it away in a double vessel, to the consumption of the third part, which let the sick make use of, both in the morning instead of a syrup, and for his drink at meales, let him take in the morning seven ounces, & an hour after move sweat: but at dinner, and supper let him not exceed fourteen ounces. But though we grant that wine is most commodious to extract the vertues of vegetables, yet this cannot be denied that by boyling the strength of wine doth vanish, and when the spirit is exhaled, there is left a nauseous phlegme less profitable than plain simple water. And therefore I am of that opinion that either the wood is to be boyled in water, and towards the end, the wine is to be added, or else the wood

Whether it ought to be boyled in Wine.

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is only to be a long while infuſed in wine, or to be boyled in a double veſſel, that nothing be loſt, but by no means to the Conſumption of the third part.

Therefore moſt commonly and rightly the decoction is made in pure water, which doth both a little correct the Heat and drineſs of the Medicine, and further the diſtribution, and provocation of ſweat, yet if the body, and eſpecially the ſtomach be cold and weak, and the Patient accuſtomed to wine, Wine is not unprofitably mixt with it, as was ſaid even now, and ſhal be ſaid hereafter; for by the admiſtion of Wine the ſtomach is leſs hurt, and the vertue of the Medicine doth the eaſier penetrate to al the parts.

The proportion of wood to the water.

And a different proportion of the wood to the water is obſerved according to the age, conſtitution of the body, and ſeaſon of the year, and they take to twelve pound of water, from three ounces of the wood to twelve: for if the ſeaſon of the year and the body be hot, 'tis ſafeſt, to take a leſs quantity of the wood, and in a longer time to perfect the Cure, than by too ſtrong a Medicine to damnefie the patient, eſpecially at the beginning of the cure, and before the ſuperfluous Humors in the body be abated, and ſweat begin to flow eaſily and exquiſitly, and the patient be accuſtomed to the Decoction, afterwards by degrees you may take more of the Wood, which unleſs it be obſerved, the Patient is eaſily brought into danger. And *Euſtachius Rudius* writes, *Lib. 5. de Morb. occult. Cap.* 13. That he hath ſeen patients who by this error, *viz.* too great a quantity of the wood given on the firſt daies, have fallen into a Feaver, that afterwards they have been forced to abſtaine from the uſe of the decoction, to their great detriment: but where there is no ſuch thing to be feared, in thoſe of ripe years, we commonly add to one pound of the wood raſped or turned ſmal, twelve pound of water, in an earthen Veſſel glaſed, and let it infuſe twenty four hours in a warm place, afterwards the veſſel being wel covered boyle it with a gentle fire, til half, or the third part remain, and let the decoction cool in this veſſel ſtil covered, afterwards ſtrain it.

After what manner 'tis to be boyled.

Fallopius Lib. de morb Galli. cap. 46. diſputes whether it be better to boyle it with an open fire, or in a double veſſel as was ſaid, or in Balneo Mariæ, and reprehends them who hold that the decoction made in Balneo is more dilute, or leſs powerful: and that the decoction made in Balneo, is more excellent than that which is made with an open fire, he endeavors to prove by the example of diſtilled waters, which by the balneum are made moſt excellent, when as there is no aduſtion in them, but the greater eliquation which is made in that hot and moiſt, doth render the decoction more excellent; but experience teacheth otherwiſe, which reaſon alſo doth confirme. For though out of ſome moiſter plants, as Roſes, Violets, Lilly of the vallies, and the like, being freſh, whoſe vertue conſiſts in the volatile part, as the Chymiſts ſpeak, the beſt waters are made in balneo without the affuſion of water: yet in hotter plants, eſpecially in Roots and woods, whoſe vertue conſiſts in the oyly part, their vertue can never be extracted by the too gentle heat of a Balneum, as happens alſo in many ſeeds, but they muſt be diſtilled by a † Veſica through which by the vehicle of the water, thoſe more fixed parts may be elevated: when as then the whol vertue of Guajacum doth conſiſt in that oyly and rozeny part, and there is need of ſtrong boyling that that may be extracted, the gentle heat of a Bolneum cannot do it, but it muſt be boyled in an open fire, which nevertheleſs cauſeth no aduſtion, if there be added a ſufficient quantity of water.

A chymical Veſſel.

Some for the better guſt, and that the bitterneſs and acrimony may be abated, a little before 'tis boyled enough add of Raiſon and Liquoriſh, of each one ounce; and you may add Sugar, or ſome Julep to relliſh it, *Aurelius Minadous, de virulen. Vener. Cap.* 4. holds the Decoction ought chiefly to be Dulcorated with Honey;

Honey; for he thinks that a smal quantity of Honey, if it be boyled with it and Skimmed, wil rebate al the bitterness, and the Decoction acquire a greater power to cleanse, attenuate, open, and make fusil the Humors, and strengthen the parts: which we grant may take place in phlegmatick bodies, and especially in a cold stomach; so whenas honey doth easily turn to Choller, we think it cannot safely be used, in chollerick bodies, hot and dry, but more conveniently and safely Raisons, Liquorish, or Sugar.

Some also in those who have a hot and dry Liver, do add towards the end of the decoction a root or two of Succory, one or two handfuls of Endive, Sowthistle: but whenas such decoctions are to be continued along while, we must have a care least by the admistion of such things they be made ingrateful, and provoke nauseousnes in the Patient: besides whenas for the most part there is boyled at one time Decoction enough for many daies, but the addition of such Herbs doth cause, that the Decoction wil not last so long, to prevent this, such herbs are to be added not to the whol decoction, but to about one pound of it.

Some not unprofitably, especially to those accustomed to it, and whose stomach is weak, do add towards the end of the decoction three pound of a sweetish white wine; some prepare the whol decoction in wine, but not so rightly: for the best part of the wine doth evaporate in boyling, and there is left an ingrateful Flegm as was said before.

Aurelius Minadous, also doth admonish, that the decoction of the wood is to be given with a vehicle, which may direct the vertue of the Medicine to the parts principally affected; and the Head most of al affected we must mix Cephalick things; the Reins affected, things Nephritical; the Liver, Hepatical; the Spleen, things Splenitick. Which as we do not wholly disallow of, so we do not alwaies think it necessary, whenas the vertue of the decoction doth easily of it self penetrate into the whol body: but we must chiefly have a care, least by the admistion of such Medicines, the decoction be rendered nauseous and ingrateful to the Patient; which when he himself also considers, he admonisheth rightly, that such Medicines are more commodiously taken by themselves reduced into a pouder, or Bolus, or some other forme, than mixt with the decoction; but we shal speak hereafter of compound decoctions.

Distilled water from Guajaum. The Chymists whenas they fear least by the long boyling, which is to the half, or a third part, the Spirituous and subtile parts should exhale and be dissipated, and so the vertue of the Medicine be diminished, prepare this decoction another way, so that it loseth nothing of its strength, they take the pouder of Guajacum and put it into a retort, and pouring a sufficient quantity of water, they place the retort in the ashes, and apply the receiving vessel, and making a fire under it, first they make a digestion, then distil it, to the Consumption of one half of the water they give of the distilled water four ounces; yet it were most commodious if the distilled water were mixed with the rest of the decoction in the retort being strained; for so they would have al the vertue; to that decoction remaining in the retort may be poured more water, and let it digest twelve hours, afterwards distil it; and the liquor distilled may be given for common drink, and whenas it happens somtimes, that Infants are born infected with the Veneral disease, or are infected by their Nurses, this distilled and sweetned with Sugar may be given them instead of Juleps.

The second decoction. Also after that the first decoction prepared the common way, is strained, twelve or eighteen pound of water again is poured to the wood remaining after the first boyling according as the Patient is wont to drink more or less, and is boyled to the Consumption of the third part; and being strained is given for ordinary drink at dinner and supper, if they desire a more pleasant and sweeter drink, you may add four ounces or more of Raysons, or instead of Raysons, one ounce or

two

two of Coriander seed prepared, and sweeten the decoction with two or three ounces of Sugar.

But if any Herbs have been added to the first decoction, the decoction for drink at meals must not be made of the remainders of the first decoction because it would be nauseous, but you must prepare another fresh decoction, but more dilute, or a wine of Guajacum, which is made thus: Take four or five pound of the wood, four pound of white Sugar, ten pound of white Wine, and put the wood into a wooden Vessel, and heat the Wine and powr it to it. *Wine of Guajacum.*

Some boyl the wood the third time, and use the decoction to boyl meat in, the same decoction also may be used to wash the hands, to clense the Nostrils, and mundifie Ulcers. *The third decoction.*

And some give this wood other waies, some in the form of a pouder, others make electuaries of it. Thus *Nicol. Massa. Lib. 2. de Morb. Gal. Cap. 6.* he takes of the Indian wood most finely prepared one pound, and with Syrup of Fumitory boyles it to the form of an Electuary, of which he gives half an ounce or an ounce; or take of the wood of Guajacum, Sarsaparilla, finely poudered, of each one ounce, of the species of the three saunders and Diarrhodon Abbatis, of each two drams; Conserve of Succory, Roses, of each six ounces; with Syrup of Succory make an Electuary. *An Electuary of Guajacum.*

Others with a convenient Syrup make pills of it.

But others not without cause do here admonish us, that such Medicines are less effectual, and that many, who were newly infected, when as they hoped for health by the use of such Medicaments, by that delay and lingring and weakness of the Medicine have fallen into a most grievous evil: for as was said, such Medicines do less penetrate into the body. Yet towards the latter end of the Cure, when the evil is almost overcome, and 'tis only feared, that there may remain some evil disposition, and the long continued drinking of the decoction of the wood is nauseous to the patient, such Medicines may be used to consume the reliques of the disease.

An extract of this wood is more commodiously prepared, and out of that pills, or rowles: but after the use of it there is need of taking some liquor, by whose vehicle the extract may be distributed and carried into the whol body: nay these extracts, according to the opinion of *Hercules Saxonia*, have scarce so great strength as to overcome this disease if it be very great and ancient, but the decoction is deservedly preferred before them. *An extract of Guajacum.*

Hercules Saxonia de lue Vener. cap. 27. writes that the oyl is stronger, and he thinks the whol Alexipharmacal power of the wood is placed in this Oyl, and he relates that he hath proved by experience, that by the benefit of this oyl; the greatest and ancientest disease hath been overcome. But he gives it divers waies, in wasted bodies with milk, in others of a hotter temperament, with Conserve of Roses, or whey of Goats; in Melancholly with conserve of Burrage or Bugloss, in Flegmatick with Conserve of Betony, in those that have knobs with Turpentine, and two scruples for a dose. But doubtless it was not oyl which *Saxonia* gave, but a liquid extract or Tincture as they cal it. For no oyl is distilled from this wood by an Alembick: but that which is distilled by a retort, or descent by an open fire, is found to be such, that it cannot conveniently be given into the body, nay scarce with safety. *The oyl of Guajacum.*

I attribute more to the spirit of Guajacum, the preparation of which is not every bodies work, for it requires a longer and more diligent digestion and fermentation for the preparing of it. *The spirit of Guajacum.*

There are some also who think, the leaves and fruit of this tree being reduced into Conserves and Electuaries are to be used, and they relate, that the Indians infected with this disease, do use them as Medicines; but though the leaves and fruit may do somwhat in a light disease, yet they are not sufficient in that which is great

great and inveterate, neither are they able to perform what the wood doth. But 'tis obſerved that the fruit of this Tree hath alſo a power vehemently to looſen the Belly; and whenas a freſh and light diſeaſe is ſomtimes cured only with purges, 'tis no wonder that the Indians may be cured by theſe purging fruits; eſpecial ſince that al Alexipharmacal vertue againſt this diſeaſe cannot be denyed them.

CHAP. XIV.

Of Sarſaparilla.

Sarſaparilla. NExt to Guajacum, that Root challengeth the firſt place in curing the Veneral diſeaſe, which ſome call Spartam Parillam, ſome Salſam Parillam; the Spaniards Sarſam Parillam, by reaſon of the ſimilitude which it hath with the plant called rough bindweed. By reaſon of its thornes 'tis called Sarſa, (for Sarſa in Spaniſh ſignifies Bryers or Brambles) but by reaſon of its leaves, and boughs, Parilla, that is to ſay the thorny vine. Nay *Fallopius de Morb. Galli. Cap.* 63. is of that opinion, that it is truly the rough bindweed, which grows every where in *Italy*, and he writes that by the uſe of it, he hath with happy ſucceſs freed many from the French Pox. *Dioſcorides* alſo *Lib.* 4. *Cap.* 139. writes thus of the rough bindweed, its leaves and fruit being drank before, and after, are antidotes againſt deadly poyſons; and beſides 'tis delivered that if ſomwhat of them poudered be given to a new born infant to drink, no poyſon ſhal afterwards hurt it. But grant it be ſo, that the Italian rough bindweed can do ſomwhat againſt this diſeaſe, as alſo againſt other poyſons, yet he himſelf grants, that there is no light difference betwixt this and the Indian.

The native place of ſarſaparilla. But Sarſaparilla grows in *Peru*, in the hedges, as rough bindweed, the white and black Bryony, and hops do in Europe. The Root creeps far up and down by the Earth, that 'tis oftentimes above ſix cubits long, which gathered into bundles is brought over to us. The good and freſh is white, ſolid, but that which is reddiſh, and poudery when 'tis broke, is leſs effectual.

The vertue of it. Its vertue as I have ſaid is very great alſo in curing this diſeaſe, and 'tis found by experience, that many have been cured by the uſe of it, without Guajacum, and becauſe 'tis more Temperate; and moderatly hot, and without any acrimony, bitterneſs, or aſtriction, or ſmel, but hath a certain obſcure ſweetneſs, it may ſafely be given to al conſtitutions of body, and al Ages; beſides 'tis of thin parts, provokes ſweat, dries eminently, reſiſts putrefaction, waſts ſuperfluous humidity, ſomwhat looſneth the body, and therefore is wont in ſome ſort to weaken the ſtomach; but though Guajacum be more powerful and efficacious, yet Sarſa in this exceeds that wood, that it hath an eminent power to allay the French pains, though never ſo accute and ſtubborn, by reaſon of its exceeding tenuity, penetrating and laxative vertue: and *Jul. Palmarius* writes, that no pain can happen ſo contumacious and ſo continual, which at length it doth not lay aſleep and overcome, if any one uſe the decoction of it for a long time and conſtantly. Nay al knotty French Tumors ſo they be not bony, in what part ſoever they are, are Rooted out by the uſe of it, their matter being melted and caſt forth by ſweats, or at the leaſt waſted and emptyed by inſenſible perſpiration: and *Fallopius* writes in the alleaged place, that if after the diſeaſe is overcome there remain Ulcers, Clefts about the Arſehole, that Sarſaparilla will heal them ſooner by half than the Indian wood, and in a ſhort time alſo the moſt hard knobs are diſcuſſed by it. Yet ſome admoniſh here, that by Guajacum indeed this diſeaſe may be perfectly cured, and that al things are found in Guajacum, which are neceſſary for the cure of this diſeaſe, but that ſarſa doth not alone, but mixt with

Guajacum,

Guajacum, China Root, and Sassafras wood cure this disease, and for this reason, because it loosnes the stomach, heats les, is void of al acrimony, and therefore is not so absterssive, and being inodorous, hath not the power to refresh the spirits. But these accusations fetcht from the manifest qualities, seem not to be sufficient; truly that Guajacum doth challenge the first place in this disease, is not to be denied, in the interim it hath been observed also by many, that somtimes this disease hath been cured by the use of this Root only; and if perhaps it do to much sax the stomach, that may easily be prevented.

The manner of giving it.

But this also is given divers waies, for the most part as Guajacum in the decoction concerning which we must note, they that wil not spare for cost and desire the decoction should be more effectual, they ought to take only the bark, as which is the more effectual part of the Root, and to cast away the inner piths as that which is les effectual, nay as 'tis delivered by some 'tis more cold, and hath a certain astrictive faculty.

The decoction.

But the Root of Sarsaparilla is taken being sliced thin and to one ounce of it is poured two pound of water, or to two ounces and an half of the Root four pound of Water; some pour to four ounces of the Root seven pound of Water, others to three ounces; ten pound of water. Neither can the quantity of the water to the Root be so strictly prescribed, but it may be varied according to the Nature of the disease, and the condition of the sick, and the season of the year. For in an inveterate disease there is need of a stronger decoction, in a new, of a weaker. But it is steeped first of al fifteen hours or twenty, and afterwards boyled to the Consumption of one half; and reasons, liquorish and other things are added to the decoction, as need requires as in the decoction of Guajacum; and because the decoction of Sarsa doth somwhat lax the stomach, for the most part mint, Betony, or somwhat else that strengthens the stomach is to be added, or what seems more commodious, Guajacum, or least the mixture of divers things may breed nauseousnes after the taking of the decoction of Sarsaparilla, they must take somwhat that strengthens the stomach.

The second decoction.

After the first decoction is prepared, fifteen pound of water are poured again to the remainders, and are boyled til a third is wasted, and the decoction is used at dinner and Supper; some also add towards the end of the decoction three pound of Wine; yet this must be done then only as *Fallopius* thinks, either when the sick body goes abroad, to preserve his strength, or when the stomach is weak.

Yet there may also be prepared out of this Root, pouders, Electuaries, extracts, as are from Guajacum.

CHAP. XV.

Of China Root.

China root.

THe Portugal Merchants brought over in the former Age, from the Country of China, a certain Root for the cure of this disease, which they called China Root; for when as the Venereal disease had invaded that Country also, as the Americans shewed the use of Guajacum for the destroying of this disease, so the people of China used this Root to cure the same disease, and taught others the use of it. But the Root is a handbreadth long, somtimes pretty thick, somtimes thinner, knobbed, somwhat reddish, pretty weighty, which being newly digged up they report is so tender, that it may be eaten raw, and boyled, as turnep and rape Roots are with us; the which seems not to be very credible, whenas our Turneps, Rape Roots dryed never attain to so great a hardnes: they are brought to us divided.

As concerning its vertues, 'tis neither ſtrong in ſmel, nor taſt, and therefore there is no exceſs of it in heat and cold, but 'tis rather temperate, or if there be any exceſs in it, 'tis rather in cold; yet 'tis dry in the ſecond, of thin ſubſtance, yet with a certain aſtrictive power, and a kind of ſubſtantifical moiſture, ſo that by the uſe of it men do grow Fat. Whence alſo the decoction of it doth eaſily ſowr. When it was firſt brought over by the Portugals into France and the neighbouring provinces, it was wonderfully cryed up by the Merchants, as being of thin parts, and having power to digeſt, to more urine and ſwear, to conſum Excrements of al ſorts, to cleanſe the Bowels, free from obſtructions, clear the blood from corruprion, to take away pains in the Joynts, to be good for the Venereal diſeaſe, and becauſe 'tis temperate, it may ſafely be given to any age, ſex; any time of the year, and to thoſe that are feaveriſh; al which faculties whenas they are not in Guajacum, by ſome of that time it was made uſe of not only for the cure of other diſeaſes, but alſo for the cure of the pox it was preferred before Guajacum. Which very thing cauſed that *Charles* the fifth Emperour, being ſick of a moſt grievous Gout, was the firſt almoſt that would make tryal of the uſe of this Root, upon the advice of ſome Phyſitians. But experience afterwards leſſened that fame; and *Jul. Palmarius* writes of this buſineſs *de lue Vener. Cap.* 14. that many to their great detriment have preferred this root before Guajacum, and that he hath found by experience, that alſo in a very ſtrict diet it hath been uneffectual againſt this diſeaſe, oftentimes alſo the ſtomach is ſeen to become ſo moiſt with the uſe of its decoction, and the Native heat oppreſt, that a great Lientery, and crudity hath often followed in thoſe who had but weak Fuell for their implanted heat. Beſides theſe diſcommodities and faults, he writes alſo that it doth oftentimes cauſe ſwelling of the Spleen and hardneſs, in thoſe that uſe it long; neither doth he grant it to have extraordinary vertue againſt this diſeaſe either by its whol ſubſtance or occult quality, when as after the uſe of it, they who thought themſelves wel, do dayly fal into a relapſe of the ſame Diſeaſe. The ſame alſo is confirmed by *Gabriel Fallopius Lib. de Morb. Galli. Cap.* 60. who writes that he hath uſed this Root again and again, for the Cure of this Diſeaſe, but could do nothing with it, in the interim he writes that he hath uſed it with happy ſucceſs for the dropſie, to moderate the mobility of the Humors in hot bleared Eyes, and in a hot diſtemper of the ſtomach and Liver. And other Phyſitians alſo agree in this, that this Root for the Cure of the French Pox is far in feriour to Guajacum and Sarſaparilla, although it be profitable to preſerve and ſtrengthen the heat of our body, and therefore for other diſeaſes. And if by chance any one, who could not be cured neither by the decoction of Guajacum nor by the unction of Quick-ſilver, hath recovered health by the Decoction of China *Jul. Palmarius* thinks this is the Cauſe of it, becauſe Nature rejoycing in the Variety of Remedies and weary of the ſtronger, at length is eaſied by thoſe that are leſs effectual. Yet *Garzias ab Horto*, relates of the Root being freſh, that it doth ſo exceedingly heat, that if any one uſe the pure Decoction of it, or drink it hot, by reaſon of the too great heat of the Medicine he wil fal into exceeding heats of the liver, Eryſipilaes, and Phlegmons, and other moſt grievous Symptoms. But when as 'tis brought over to us inſipid and ſomtimes duſty, there is no cauſe to fear any ſuch thing. Neither doth this only happen in this plant, but alſo in many others, that the Alimental juyce hath far othet vertues, then the dryed Plants: and therefore though perhaps this Root being freſh in China may have great vertue to Cure the Venereal Diſeaſe, yet it is not neceſſary, that it retain the ſame with us.

The decoction of China.

But divers prepare the decoction of this root diverſly, *Jul. Palmarius* writes that the common way of preparing it is this, that to two ounces of the root, cut into rounds, and put in an earthen pot, there is poured four pound of water and let them ſteep twelve houres, afterwards boyl with a gentle fire to the conſumption of the

the one half. *Fallopius* boyles two ounces of the root in twelve pound of water, to the consumption of half, but according to the nature of the disease the proportion of the root and water may be varied: and the root may be boylled from one to three in twelve pound of water. Yet *Septalius* adviseth us here, that this decoction is most commodiously prepared, if one ounce of the root fresh and not rotten be boyled in ten pound of water, & two ounces in twelve pound of water. For he writes, though many physitians, to save charges, whenas many cannot take al that decoction in one day, and they feare if they should keep it another day it would grow sowre, do boyl half the portion of China in half the quantity of water, and boyl away the half, or two thirds, thinking that so they have both saved their purse, and prepared the decoction as strong, yet they are very much deceived, and if they have not lost their taste, they shal easily know, that that first decoction is much more powerful, than the second, and the reason is ready, because 'tis not enough to give a proportion of the root to the water, but the time of boyling is cheifly to be considered, and the action of the heat of the fire, and the reaction of the water. For whenas, foure houres space, imagine, ought to be allowed, to extract the vertue out of a most hard root, and communicate it to the water: how much time wil be spent in boyling away six or eight pints of water, if taking but the half quantity, viz. half an ounce of China with six pints of water, we suffer the half to wast or two thirds, which wil be consumed in less than two houres space, the water being less able to resist the action of the fire? nor let any one dare to say that we may prevent this inconveniency, by making a less quantity of fire, and if it he boyled by a slower fire for to extract this vertue out of a more solid substance, there ought also to concur a due quantity of fire.

Out of the remainders another drink is prepared by some for dinner and supper, as out of Guajacum. Yet *Palmarius* thinks that al the vertue of that root is transfused in the liquor at the first boyling, and therefore for ordinary drink he boyles three ounces more of the root in eight pound of water til two pints are consumed and he ads raisons and liquarish, nay some also drink the first decoction, at dinner and supper, whenas it is not unpleasant to the tast. *The Second decoction.*

Some also do admonish us, that we provide no more of the decoction at once than may be spent in one day, whenas it quickly growes sour when 'tis cold, therefore they command also that it be kept on warm ashes: but experience hath taught us that it wil last four dayes. Yet because it growes sour, that very thing tels us that this root hath in it, somewhat spirituous and alimental, which is the cause of fermentation, and hence of acidity.

Consult concerning this with *Amatus Lusitanus centur.* 1. *curat.* 98. and especially *centur.* 2. *curat.* 31.

CHAP. XVI.

Of Sassafras wood.

THey use also for the cure of the Veneral disease that wood which is connonly called sassafras, which is imported form the Island called *Florida*: it is of an aromatical taste like fennel: 'tis hot and dry in the second degree, of a thin substance and endewed with an opening, discussive, and attenuating faculty; and therefore is commended by them who have sailed to the Indies, against long tertian feavers, evil habit of the body, and dropsie, and to strengthen the stomach, and against nephritical paines, it is comended also for the gout, to move the courses, and many other diseases, to treat of which is not proper to this place; 'tis used also for the cure of the French pox, yet most physitians agree that 'tis less effectual than Guajacum and sarsaparilla, and the decoction of it is prepared almost as that of Sarsaparilla. *Sassafras-Wood.* *Its vertues.*

Chap. XVII.

Of Sope-wort,

Soapwort. Last of al sopewort is commended by some physitians for the cure of this disease which is bitter, acrid, and endewed with an abstersive and opening faculty, and is praised for the French pox and contumacious paines, which cannot be over come by other remedies. 'Tis reported to be the invention of *Zapata* a spanniſh Empirick: tis used both in the decoction, and in substance, the decoction is prepared after this manner.

Its decoction. Take *of green sopewort two handfuls, infuse them al night in eight pound of water, than boyl it til the sopewort is boyled enough, then strain one pound of it with half a pound of water and the herbs now boyled; and squeez them, and reserve it for a mornings draught to provoke sweat; taking seven or eight ounces. But that which remains sweeten with raisons or sugar for drink at meales, in summer and Cholerick bodies you may add one handful of Sowthistle or basterd Navelwort.*

But tis a remedy unpleasing to the taſt, *Eustachius Rudius* takes of soap-wort six pugils or more, and infuseth it in twelve pound of water, and boyles it to the consumption of half. But as *Septallius* hath observed, tis too great a quantity of water to so smal a portion of soap-wort.

The pouder. But the Root Cheifly is used in substance, and *Rudius* doth very much commend it in ancient french pains, and out of it he prepares this pouder.

Take *of ground pine two ounces; of white dittander one ounce and half; of Zedoary six drams: of the root of soapwort three drams: of pearl prepared half a dram.*

Make a pouder for 9. doses, but who can take for one dose almost four drams of pouder? and the other medicines do far exceed the soapwort, which notwithstanding ought to be the basis.

CHAP. XVIII.

Of Compound Alexipharmaca.

Compouond Alexiphbrmaca in the Veneral disease. But though al the medicines hitherto reckoned up, are good to destroy this disease, yet some are more effectual then others, and besides some have other qualities, for the which they are useful sometimes for this, sometimes for that end, as was said of the simples: and therefore seldom one of these medicines is used, but for the most part, many of them together. Indeed if the disease be simple, and none of the bowels be affected, nor there is no eminent distemper in any part, which may hinder the use of Guajacum, that wood is the most excellent of al, because it resists this disease both by its occult and manifest qualities: but if any disease be joyned with it, tis oftentimes most proficable to add sarsaparilla and China and there are added by some manny altering medicines, of which whenas we spake before, in this place we shal add nothing of them, but this, that we must have a care least by the mixture of Succories and endives and cooling medicines which are added to moderate the heat of Guajacum which yet is not so much to be feared, they hinder sweating which is only to be desired, and which brings more benefit, then a little heating can do dammage: next of al least by the admixtion of other things the drink be made ungrateful and nauteous, therefore passing by these that we may speake somewhat of the mixture of alexipharmaca, if the nature of the patient be very hot and dry, and

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the humors violently fal from the head on the lungs, breast or other parts, Guajacum wood is not commodiously given alone, whenas it doth farther heat and dry the parts, and by its heat make the humors run and move, but then sarsaparilla is safer, and China more comodious, which doth at once moderate the heat, and hath an astrictive power, by which it stops defluxions: on the contrary if the strength be feeble, and there be a weaknes of the sight, sarsa is not commodious, whenas it loosens the stomach, and duls the sight, if there be a great consumption (if so be it hath not its original from the Venereal disease, for then this disease being taken away as the cause, that wasting also ceaseth, and the body begins to be nourisht better) Guajacum and sarsaparilla are not safe, But then china is far more profitable, as that which moistens substantifically, as they speak. Yet *Ludiciptalius* commends Sasaparilla above al the rest against a consumption, *lib.* 7. *animadv. num.* 214. as shal be said also hereafter in the last chapter. So if cruel paines molest the patient, or gummous tumors, or exceeding ulcers be joyned with them, Sasaparilla is most profitable, which doth discusse the french knobs, and easier appease the pains, then Guajacum. Thus according to the constitution of the Patients, and the Nature of the Diseases joyned with it, 'tis good sometimes to use Guajacum alone, sometimes Sarsaparilla, sometimes China Root, and sometimes to mix al of them, in a greater or lesser quantity, and sometimes the bark of Guajacum is added, sometimes three or four ounces weight to one pound of the wood, and they are boyled in fifteen pound of water. For examples sake.

Take *Of the wood of Guajacum half a pound; of the bark of the same, of sarsaparilla each three ounces: of China root one ounce and half. Infuse them twenty four houres in twelve pound of water, afterwards let them be boyled to the consumption of half, for a sweating drink. Poure on the remainder twelve pound of water, let them stand and infuse eight houres, afterwards boyl them to a consumption of a third part, for drink at meales.* Or.

Take *of the Wood of Guajacum one pound; the bark of the same, Sarsaparilla of each thre ounces. Boyl them in sixteen pound of water, to the consumption of half.* Or.

Take *of the wood of Guajacum, China root each one ounce an half, Sarsaparilla one ounce; infuse them twenty four hours in six pound of water, afterwards boyl half away. Poure on the residue ten pound of water, boyl it to the consumption of three pound: Strain it and give it for drink at meales.* Or,

Take *of wood of Guajacum eight ounces; of the bark of the same four ounces; sarsaparilla, sassafras wood each two ounces. Boyl them in twelve pound of water to the consumption of two thirds that there remains four pound, towards the end ad four pound of wine. Poure to the remainder sixteen pound of water: boyl it to the consumption of half, & towards the end ad four pound of wine, make a drink for meales.*

Whether purgers ought to be mixt with the decotion.

In this place we must not omit a question, concerning the use of purgers, whiles the decoction is drank to wit whether they ought to be mixt with the decoction or to be used at the same time with the decoction. For some do wholy reject them, and hold that purgers are neither to be mixed with the decoction, nor to be used apart, for this reason, because the bodies are wont diligently to be purged before they come to the use of these decoctions; next of al because purgers and sweaters do cause contrary motions. Others on the contrary do mix purgers with these decoctions, that by benefit of them the blood may be purified, and the belly constantly kept loose: others do not mix purgers with these decoctions, but purge at certain intervals, every eighth or tenth day, or at a longer distance, as need requires. which last opinion seemes to me to be treweſt. For though the body be purged before the use of these decoctions, yet some may easily remain, and ever and anon be collected, and sweating doth purge onely the thinner humors, but leaves the thick, neither after this manner are there caused contrary motions; for that day, that purging is ordered sweaters are not administred; but if purgers were mixed with the sweaters then there would be contrary motions. And besides by the admistion of purgers, the decoction being to be used so many weeks it would become nauseous and ingratful.

Hercules

Whether purgers may serve instead of sweaters.

Hercules Saxonia also holds *de lue Vener. Cap.* 38. That purging may be ordered every day, to wit in those, in whom sweat cannot, or ought not to be caused: he thinks sweat cannot be provoked in them, who either are of such a hard and thick Skin, that they can by no means sweat, or in those who fal into fainting and swouning fits, as soon as sweaters are administred: but he thinks they ought not to sweat, in whom the Veneral disease possesseth not the Joynts, nor the Skin, nor the superficies of the body, but hath rather taken up its seat about the bowels; but this opinion seems not to me to be agreeable to truth: for whereas he thinks, that some ought to have purgers administred because they cannot sweat by reason of the thickness of their Skin, or because they presently fal into swouning fits, is agreeable neither to reason, nor experience: for scarce any one hath so thick a Skin, that the pores wil no way open for sweat, and though on the first daies sweat doth not presently follow, yet after that the Humors are attenuated by the use of the decoctions, the passages and pores are opened, then sweat succeeds; especially if those Laconick Baths be applied as shal be said hereafter. And the Patient may so moderate his sweating, that he need not fal into fainting or swouning fits: and they that cannot endure sweating, wil not easily endure purging. Last of al purgers cannot performe the same, as those sweaters do. But that in some bodies sweaters are not to be administred, is falf: for though the disease may have its principal seat about the Liver and bowels, yet it cannot be, but also vitious Humors do abound in the whol body, whenas the Liver infected with this disease doth generate virulent blood, and distribute it to the whol Body.

Chap. XIX.

Of the manner of using these Medicines.

The manner of using these Medicines.

AS concerning the manner of using these Medicaments, first of al the decoction of Guajacum is administred, for the most part in the morning, and afternoon two hours before Supper. In the morning 'tis given from five ounces to eight or nine ounces before the evening, from three ounces to six ounces; the pouder is given to two drams, the extract to two scruples. Yet sometimes the evening drauft is omitted, especially at the begining, before the patient is accustomed to the Decoction. For what was said above of moderating the quality of the decoction, that also is to be observed concerning the quantity of the Decoction to be given, that the sick be not offended and overcharged which too much of it; which unless it be observed, it happens sometimes, that the sick fal into Feavers, contract Crudities, and there is caused a loosness, ill habit of body, and a Dropsie.

The dose of the decoction.

After the same manner we must give the Decoction of Sarsaparilla, China Root, and the compound decoctions. For though some do prescribe here divers doses, yet he shal not erre, that shal administer them in the aforesaid manner.

Sweat.

And indeed after the mornings drauft, we must endeavor that the Patient sweat; for experience teacheth, that they that sweat not upon the taking of these Medicaments, are scarce clearly freed from this Disease: but that sweat may flow the easier, let the Patient sleep one hour after he hath taken the Medicine, for so the Medicine is deduced into act. As for the time of sweating, first of al it is sufficient, if the patient sweat one hour, afterwards by degrees let him rise to more. But the manner of sweating is various; most do suffer their Patients to sweat in bed, which that they may do the easier bottles ful of warm water, or hot brick wrapt up in Cloaths, must be placed under the Arm-pits and sides of the Patient. Some provide a wooden Mantle such a one as *Andreas Tenzelius*, hath discribed and set forth in *Exegef. Chymiatr.*; which manner of sweating is not a little troublesome. But not without cause most men do prefer before al kinds of sweating in this disease, that which is

The time of sweating.

in

in a bath or sweating place as that which brings less trouble to the sick, when as weak Patients sweating in their bed, may use a Bath and a sweating place, and the heat of the bath may be made more intense or remiss at pleasure, be made dry or moist as the condition of the sick requires: yet a moist bath, and gently heated by the Vapor of hot water is most commodious; whenas that hot vapor of the Water, doth open and Lax the pores of the Skin, that the sweat flows the easier, and without any trouble to the sick: but dry baths are altogether laborious, and ought not to be used in dry and Melancholy bodies.

Baths twofold.

But those sweating baths are twofold, first of al those gaeat ones in which a body may walk, such as are our baths so commonly called in which many at once may sweat and be washed; such though they be used for the cure of this disease by Barbers in Italy, yet they ought to be eschewed, whenas if one that is lightly infected, receive that which exhales from another grievously infected, he may be infected more, and 'tis more commodious that every sick body sweat by himself. Then there are baths or smal sweating places in which one alone closed up may sweat: such are made of bords of wood Joyned together, which again are twofold, some which can receive a man upright. Without bowing of his body; *Jul. Palmarius* discribes it *de lue Vener. Cap.* 17. of a Square figure, seven Foot high, and four foot long and broad, whose description you may see there. With us others are in use made up of boards mutually receiving and received by one another, square, but oblong of that bredth, that a man may without any impediment set and extend his Arms, but two stories high, one where the Patient sets, so high, that as he sets he may put forth his Head, through a hole of the bords strictly fitted for the neck, but the lower part is of that depth, that if the Patient setting stretch forth his Feet, he cannot reach the lowest board: and it hath a little door, through which the sick may go into it, and a window behind, which may be opened upon neceffity: and it hath another little door towards the feet, through which an Iron or brass Vessel is put in ful of stones or refuse Iron red hot; and a Pipe in the upper part of it over against the Vessel, through which either plain hot water, or some convenient decoction is poured on the stones or dross by degrees, as much as the Patient can endure, from whence the Vapor exhaling diffused al through the body doth provoke sweat: and though after this manner the head be thrust forth, yet that doth no hurt, neither is it unprofitable, even where the head is affected; for though it stands forth, yet that sweats plentifully enough: in the interim the Patient doth not attract again by drawing in his breath those filthy Vapors which do Evaporate from his body, but the free and pure ayre by which he is refresht, that he doth more easily and happily endure sweating. But in what bath soever sweat is provoked, after the sweating is over the bath ought to be opened, that those filthy Vapors may be blown away and discussed by the free Air.

When we must sweat.

The most convenient time for sweating is the morning, yet somtimes we may sweat after noone, in which case the strength of the Patient is to be considered for there are some who wil easily endure sweating twice a day, other who but once, others who are not able to endure sweating once every day. But the Medicines which moue sweat must be taken upon an empty stomach, and an hour or two after the taking of the Medicine sweat must be urged.

How long.

But we must sweat so long as the strength of the Patient wil bear it, and if the patient sweat in a bath, or sweating place, and is not able to endure any longer the heat of the bath, he must be laid in his bed, in which afterwards sweat wil flow of its own accord, and without any loss of strength; the sweat must afterwards be wiped of, and after sweating the cold ayre must in no wise be admitted.

How often.

But how often we must swear, and how long the use of these Medicines is to be continued, cannot be defined in general. They commonly teach that these decoctions are to be continued for forty daies, yet somtimes twenty five daies or thirty do suffice: and somtimes in a more grievous Disease we must persist in the use of

these

these Medicines til sixty daies and more. For we must sweat so often and so long, til the Malignity of the Disease is overcome, and the vitious and virulent Humors are discussed by sweating, and al the Symptomes cease, especially the running of the Reins and Callous skars. For as long as these last. We must remain in the use of these Medicines. Nay though al the Symptomes do vanish, yet it is good so to continue the Medicines for some daies, that also the Maligne dispositions of the parts may be taken away, that there be no fear of a relapse.

But after noon, though sweat be not moved, yet the same decoction given then, may insensibly discusse the vitious Humors, and destroy the virulent disposition impress both on the parts and Humors.

CHAP. XX.

Of other common Alexipharmaca.

Common Alexipharmaca.

BUt some trust not to those Alexipharmaca alone, as Guajacum, Sarsaparilla, China Root, and Sassafras wood, but add also common Alexipharmaca. This was first done by *Fernelius*, who gave to those that were to drink the decoction, half a dram or one dram of this Opiate, or Alexipharmacal antidote, which is prepared thus.

Fernelius, his antidote. Take *of the Leaves of water Germander, half an ounce; Poley of the mount. Penny royal, white Hore-hound, Origanum, Calamint, St. Johns-wort, centory the less; French Lavender, ground pine, Germander, Spikenard, of each two drams; of the Seeds of Anise, Fennel, Parsly, wild carrot, Libistick, Rue, Basile, Clary, Cresses, of the Berries of Bay, Juniper, of the Seeds of Male Piony, of each half a dram; of the Roots of round Birth-wort, Gentian, Dittander, Valerian, Asarabaccha, of each one dram; of Nut-megs, Cloves, Pepper, Saffron, of each four scruples; of Cinamone, Myrrh, Castor, Styrax Calamite, of each three drams; of good Honey as much as is Sufficient, make an Opiate.*

Jul. Palmarius, Fernelius his Scholer followed him, who, as was said before in *Lib.* 1. *de lue Vener. Cap.* 7. writes, that *Fernelius*, was most averse from the use of Quick-silver, and first dared to promise the Cure of this Disease without the help of that, and did take care for the compounding of many Alexipharmaca at his House, which he administred against the Mischeif of this Disease, with Guajacum and also without it, two of the which, which he found to be most excellent and efficatious, he describes, the first was discribed even now, the other is this.

Take *of Divils-bit, Scabious, Burnet, flowers of Marigold, Mullein, Plantane, Balme, Rue, Broom, Origanum, Rosemary flowers, Red Roses, of each three drams; of the Seeds of Citron, Sorrel, Fennel, blessed Thistle, of the Roots of Dittander, Gilliflowers, Tormentil, round Birthwort, Gentian, Zedoary, Roman Woolfesbane, of each two drams; Hartshorn, shavings of Ivory, Wood of Aloes, Yellow Saunders, Choice Cinamome, of each half an ounce; Saffron, Cloves, Nutmeg, of each two drams.*

And he relates that he called the first composition, the greatet Opiate, the other the less, and that he gave for a dose half a dram of either with the like quantity of conserve of Bugloss and half a scruple of Mithridate, and somtime without Mithridate; bnt that he, after *Fernelius* departed this life, out of them both did compleat one, adding also certain other Medicines, which he found to be prevalent against poysons, and most fit to provoke sweat, the description of which is this.

Take

Take *of water germander half an ounce; of divels-bit, scabious, burnet, Poley Mount, peneroyal, calamint, white sweet smelling Horehound, origanum, mint, St. Johns-wort, centory the less, French Lavender, Germander, Ground Pine, Plantane, Balme, rue, Time, Elder, each two drams; of Hyssop, the lesser Sage, Oake Ferne, vervin, both speedwels each two drams; Flowers of Betony, Marigould, Mullen, Broome, Rosemary, Jasmin, Sage, Red Roses, St. Johns wort, Bugloss, Burrage, Violets, Water Lilies of each three drams; Seeds of Anis, both Parsleys, wild Carot, Scarlet Graines, St Johns Wort, Libistick, Rue, Lovage, Basil, Berries of Bay, Juniper, seeds of both Pionies, Hartwort of each on dram and half; Seeds of citron, Sorel, Blessed Thistle, Fennel, of each three drams; of the roots of male Piony, Round Birthwort, Gentian, Sweet cane, Flowerdeluce of Florence, Sweet Cyprus, each one dram; of Angelico, Dittander, Gilliflowers, tormentil, Zedoary, Romane Woolfesbane, of each three drams and an half; of choice perle three drams and hal; of Harts horn, Shavings of Ivory each one ounce; wood of aloes, yellow saunders, bone of the heart of a hart, both currals each half an ounce; choice cinamon one dram and half; Balsome wood, if it may be had one ounce; of al pretious stones, each half a dram; of Nutmeg, mace, loves, myrrh, styrax, Calamite, Benjamin, Saffron, Castor, each half a dram; juice of liquorish one ounce; oyl of the seeds of Fennel, Anise, of Sage, mint, juniper, Nutmeg, Cloves, red opobalsamum brought out of America if it be to be had of each one dram.* Galmarius.

Let al the the herbs, flowers, and rootes be gathered at that time they are of greatest strength, let them be dryed, and kept in paper cases, then al of them being reduced into a most fine pouder, let them be mixt with wine and honey, and be boyled into an electuary, til it comes to the thickness of wel prepared mithridate: yet the flowers may be candied and kept with sugar, that they may be mixt with the other things towards the end of their boyling, to one pound of honey mix two ounces of the pouder. Let it be kept in a most large earthen vessel, whose third part may be empry, least it swel up, and grow hot, neither let it come to that use we shal by and by speake of, before it be three years old. He ads there also a cordial water, and an alexipharmacal pouder, their discriptions are these; the Cordial water.

Take *Of the leaves of sage, mint, marioram, rue, hyssop, origanum, the tops of betony each one handful. Bruise them al and put them in a great earthen vessel in a warm place and cover them with the water of blessed thistle, that they be under water. it, every day stir them with a stick, and before they soure, (which wil be the fourth or fifth day after) Strein out the liquor and keep it, casting away the Fæces. Again.* Galmarius his Cordiol water.

Take *of plantane leaves, marigold, balme, mullein, St. Johnswort centory the less, burnet, each two handfuls. After they have been steeped four dayes and streined cast them away, and take again of water germander, Bivels-bit, fennel, parsly, bugloss, burage, angelico of each one handful. Which also being steeped, so many dayes streined and then cast away.*

Take *of the roots of angelico, dittander, tormentil, betony, Zedoary, each half an ounce; of galangal, three drams; Nutmegs, Cloves, each one dram; seeds of Fenel, Citron, Sorrel, Blessed thistle, Juniper berries each two drams; Shavings of Ivory, harts horn, wood of aloes, Yellow Saunders, cinamon each one dram; Safforn half a dram; make a pouder of it and mixe it with the Liquor streined, then weigh out of the amulet against this disease, and of choice mithridate each one pound and half; of old treacle foure drams; and being mixt with the said liquor and pouder, and put up in a glass alembick, or an earthen one glazed, expose them six or eight dayes to the heat of* June, *til they grow hot, and be perfectly fermented, and at length distil them in a double vessel with a most gentle fire. If the same simples be put into a new pot with the water of bastard saffron and be heated fifteen dayes in warm horse-dung, there wil be extracted a more excellent Water.*

Take *of the aforesaid water three ounces*; *Syrup of* Lemmons *and Violets, of each six drams*; *Make a dose.*

A Description of the Pouder.

Palmarius his Alexipharmacal Pouder. Take *of the shavings of Ivory, the younger Harts-horn, Choice Pearles of each half a dram*; *wood of Aloes, Yellow Saunders, the bone of the heart of a Hart, of each one scruple*; *Seeds of Fennel, Coriander prepared, of each one dram*; *the Leaves of Mint, Plantane, Vervin, Burnet, of each two scruples*; *the Roots of Tormentil, Betony, Zedoary, of each half a dram*; *the dryed flowers of* Betony, *Marigold, Broom, of each half a dram*; *Sugar of Roses three times as much. Make a fine Pouder.*

The dose is one spoonful beforemeat, and before a drauft of the sweating drink, if the Patient refuse the use of the Opiate.

And in *cap.* 13. *Lib. de lue Vener.* where he disputes, whether this Disease may be perfectly cured by the use of Guajacum alone, or whether there be need of the assistance of other Medicines joyned with it, at last he concludes with a distinction, that the vertue of Guajacum is neither so great, that that alone can wholly Extirpate, the Roots and whol malice of the Venereal poyson, nor so weak, that it can perform nothing without the help of others; that by the use of that only, the Humors be wasted, al Symptomes wil at length be allaied, and wholly lie hid, but yet the taint of the disease, which hath already taken possession of the solid parts, cannot in most bodies be wholly overcome, and extinguisht by that remedy.

Rondeletius his Treacle Water. *Rondeletius*, doubtless followed these men also, who *de morb. Itali.* commend his Treacle water, which provokes sweat in the inveterate Italian Disease, and takes away the pains, the description of which is this.

Take of Treacle, one pound; *of Sorrel, three handfuls*; *of the flowers of Chamomel, Pery-royal, Pomegranates, blessed Thistle, of each two ounces. Mix them al in white wine and distil them.*

Of which water give three ounces to drink with three ounces of Sorrel and Buglos water, when the Patient goes into his bed or hot house.

Platerus also thinks that it is confirmed by experience, that the decoctions of other plants, besides Guajacum, Sarsaparilla, China, Sassafras; can performe the same in this disease as they do, and therefore fals into this opinion, but evilly. That the late mentioned Medicines which are accounted alexipharmaca of this disease, do work rather in the cure of this disease, by moving sweat, then by an occult quality, and therefore he thinks that not only a decoction of box wood, Juniper, Cedar, Cypress, and Savin, Agallochus, Rose-wood, but also the decoction, and Treacle water, which are given in Pestilent Feavers, are profitable also here.

Whether treacle be good in the Venereal disease. *Aurelius Minadous de lue Vener. cap.* 53. when he had spoken many things in the praise of Treacle at length concludes, that Treacle also may be used against the venereal virulency, as a most excellent Alexiterum, not as if it were to be numbered amongst them, which of themselves are said to expel this virulency, but amongst them, which expel it by accident, in as much as it doth strengthen the spirits, by a Conformable proportion to them, so that they being now made strong, are able as the principal agent, together with the Treacle as their instrument to overcome the maligoity of the venereal virulency.

Trochisks Cypheos. The same Author *cap.* 44. commends Trochisks Cypheos in this Disease, as being such, which do principally strengthen the Liver, which in this Disease is chiefly affected, and free it from Excrementitious Humors, which are collected in this Disease, being powerful to concoct, cleanse, and dry up the Excrement and therefore as *Galen* thought this Composition was to be preferred before al other Medicines written by *Asclepies*, *Andromachus*, and other most Famous Physitians for the affects of the Liver, so he thinks the same is to be used and Magnified beyond al others in this Disease.

But

But as I wil not disswade any one from the use of such common Alexipharmaca in the cure of this Disease, whenas in other cases it is a custome, when any one hath drank poyson, or any waies taken it, and knows not what it is, to give treacle and common Alexipharmaca: so I wil counsel no body. that he confide only in these Medicines, and neglect those proper ones. And I see it done by very few Physitians, as being taught by experience, that this Disease cannot wholly be extirpated without Guajacum, Sarsaparilla and the like, neither doth it follow, that therefore, because some sick of an incurable French Pox, could not be cured by Guajacum wood, that we must place more hope in these Medicaments. For they that could not be cured by those proper Alexipharmaca, wil much less be cured by these common ones.

CHAP. XXI.

Of the Cure by Quick-silver.

Of the cure by Quick-silver.

AND this is the chief kind of Medicine for the cure of the Venereal disease, and this is the chief manner of curing it. For there is also another way of curing the same Disease by quick-silver, which was first brought into use by Chyrurgions and barbers, afterwards also was applyed by learned Physitians. For whenas, as was said before by *Fracastorius*, certain Barbars had found out amongst the Medicines of our ancestors for the filthy scab joyned with the pains of the joynts, unguents compounded of Mercury and Sulphur, other Medicines profiting little, they began to use them. The use of which being not altogether unsuccessful, afterwards quick-silver was used in the cure of this Disease by many learned Physitians.

Quick silver whence so called.

Its wonderful Nature.

But though it be not my purpose in this place to treat of quick-silver, which the Chymists cal Mercury, but rather of the use of it in curing this disease, yet I shal admonish you of a few things in general. Quick-silver is reckoned amongst the mettals, and 'tis called Silver from its color in which it resembles silver, but quick because 'tis alwaies moveable: and its Nature is altogether wonderful, which many learned men admire, and which hath tortered the wits of many Chymists, and deluded their pains. For though it be mortified, fixed, or what way soever it oftentimes seems to be changed, yet it is easily reduced to its former quick Nature. And though it be reduced into the smallest bodies, and transmitted through leather, or be otherwise reduced into atomes, and a strang form, yet it retaines in them its whol Nature and essence, and returns to its former quick body.

Whether Quick silver be hot or cold.

Matthias Unzerus his opinion.

Naturalists and Physitians differ concerning its temperament, whiles some hold it to be cold others hot. *Matthias Unzerus*, hath collected the arguments of both in *Anatom. Spagyr. Mercu.* to alleage al which at large in this place, is not our intent, for you may consult with him on that business in the alleaged place; yet by and by we shal make mention of some of them: but *Unzerus* himself, *cap.* 12. goes the middle way, and holds, that some natural things have oftentimes in them diverse, and wholly contrary vertues and faculties, and some of them are manifest, others occult, and that these depend on the specifick form, those on the first qualities of the Elements, which he proves by the examples of Wormwood, Rhubarb, Vineger, and others: and he thinks Mercury is to be reckoned in the number of these which may be considered both as crude, and as prepared: the crude he thinks hath mixt qualities, and is partly hot, partly cold, and that diversity is to be attributed to the divers parts of the matter of which it consists, some of which are very thin, Subtile, pure, and Spirituous, but some are thick, earthy and feculent: but he thinks that Mercury prepared hath no longer any

cold quality, but they are wholly taken away by the outward help of fire, or by the Application of the menſtrua, and therefore that it is very hot

Hercules Saxonia. *Hercules Saxonia*, holds the ſame *de lue Vener. Cap.* 39. Whiles he teacheth, that this Medicine doth exulcerate, and cauſe heat and inflamation; on the other ſide it cauſeth numnels, Palſies, and other cold affects, and that it proceeds from the inequality of its temperament, and becauſe 'tis an imperfect mixt body, and if it be prepared by calcination, that the cold ſubſtance doth fly away, and that which is left, is fire,

The authors opinion. But theſe authors erre very much. indeed it cannot be denied, that there are many Medicines, which have Heterogeneous parts, by vertue of which, they produce divers effects, which parts alſo may be ſeparated by the help of art: But that Quick-ſilver hath ſuch parts, is falſ, neither was there yet ever found any Chymiſt, who could ſhow the diverſe parts in it, and ſeparate them by art: for the whol is Homogeneous, if there be any thing ſo in Nature, and either it al flies away, or al remaines, and what way ſoever it is prepared, at laſt it al revives wholly Homogeneous: and whatſoever Chymiſt can ſhow any Heterogeneous parts in Quick-ſilver, as in Rhubarb, ſhal be in my eſteem a great Apollo. Neither is precipitate of another Nature then that which is crude, neither doth Quick-ſilver looſe any thing by its preparation, and that prepared does differ from the crude only in external form which is cauſed by the admiſtion of other things, which ſomtimes are Salt parts as happens in Mercury Sublimate and Precipitate, ſomtimes only watry as when Mercury is reduced into water by a retort without the admiſtion of any other thing, as the ſame *Unzerus* teacheth *Lib.* 2. *de Anatom. Mercu. cap.* 2. *n.* 4. for this water is nothing elſe but the Quick-ſilver reſolved into the ſmalleſt bodies or Atomes by the ſtrength of the fire, and mixt with watry Vapors, or the moiſt Air. Yet in that there appeare no effects of cold, but rather of heat, and that very water, as other mercurial waters, wil diſſolve gold in like manner, *Saxonia* is miſtaken, for Quick-ſilver is no imperfect mixt body, but a body that hath the moſt perfect miſtion, and cannot be deſtroied, by any art of the Chymiſts, but every where retaines its form, neither whiles it is calcined (or rather expoſed to the fire, for Quick-ſilver cannot properly be ſaid to be Calcined) do the cold parts fly away, and the fiery ſtay behind, but if thoſe parts which are raiſed up be received, they are of the ſame Nature with thoſe that remaine, as is wel known to the Chymiſt.

Quick-ſilver is Homogeneous.

Quick-ſilver is hot. Therefore whenas this Reconcilation is of no force, let us ſee who is in the righter whether thoſe who hold Quick-ſilver to be hot, or thoſe that ſay 'tis cold. But I think that they are altogether of the righter judgment, who think it to be hot; for that appears by its great penetrating and corroding vertue, ſo that it penetrates and Eats into Mettals, and the fleſh, nay the very bones are corroded by Mercury precipitate and ſublimate. Aud *Libavius* writes in *tract. de igne natu. cap.* 30. that he knew by the relation of a moſt learned Phyſitian, that a certain Chyrurgion dying by the too frequent uſe of Mercurial Medicines, had his bones plainly britle or frangible.

The anſwer of the reaſons againſt it. But whenas they object firſt of al, that whiles 'tis quick and whol it doth not corrode: the cauſe of that is, becauſe it cannot inſinuate it ſelf into the body, and worke upon it, whenas al its parts are moſt cloſely knit together, nor cannot be mixed with other bodies; but the Medicines prepared out of it as Mercury ſublimate, Precipitate, Oyl of Mereury, and if there be any more of this kind, have a great power to burn and corrode not only by the reaſon of Salts commixt, which is very little, but becauſe 'tis reſolved into the ſmaleſt bodies, and being mixt with the Salts it can adhere to the body, and by the beneſit of things admixt, moſt intimately inſinuate it ſelf into it.

1.

2. Secondly, whereas Quick-ſilver appears cold to the touch, that is common to it with ſteel, Brals, Lead, Wine, things of their own Nature hot, which by accident feel to be cold.

Thirdly,

Thirdly, whereas some also from the effects would collect quick-silver to be cold, in that they are very much deceived; and they attribute those effects to cold, which have their dependance elsewhere. Truly, they that drink the waters infected with quick-silver on the Alps, are sick of divers fluxes, and are taken with a bronchocele. Goldsmiths, and others, who often deal with quick-silver, are seldom healthful and long lived, but are obnoxious to numnesses, tremblings, palsies, convulsions, lethargies, suffocating, catarrhs, and appoplexies. Thus *Fernelius* relates of a certain Goldsmith that imprudently admitting the vapour of quick-silver only, presently became stupid, drowzy, and wholly speechless. *Ferdinandus Ponrettus* relates that the same happend to another, *lib.* 1. *de vene. cap.* 3. And *Forestus, lib.* 8. *obser.* 5. writes, That a certain yong man learning the Smiths art upon the arching of a Cup with quick-silver, had all the hair of his head fell off, and that his face became extraordinary pale, and all his body tremulous: and many others have observed the same. And *Jacobus Oethæus, in his observat.* reports, That a certain yong Noble man troubled with Crab-lice in his Privities, used Mercurial Oyntment to drive them away; upon which his Yard grew cold and sluggish, and unfit for Venery. But here is a fallacy of the cause, for quick-silver doth not do these things by cooling, but because it hath a peculiar and occult quality, that is an enemy to the Nerves and Brain, as appears in many other stupifying poysons. 3.

Fourthly, That which is Objected, is easily Answered; to wit, That the damage brought upon mans body by quick silver, is cured by the use of hot things; as Sage, Hyssope, Origanum, Clary, Rue, Castor, and the like: For those Medicaments are not therefore applied to the preternatural affects caused by quick-silver only, because they are hot, but because they are friends to the Brain and Nerves: and furthermore, as they themselves grant, by a specifick property are enemies to the Mercurial virulency; and that such things are not therefore applied because they are hot, but because by a peculiar vertue they are friends to the Nerves, it appears by this, because other hot things, as Ginger, Pepper, and the like, which have no specifick property freindly to the Nerves, do not perform the same. 4.

But concerning the Occult Vertue and Propriety of Quick-silver, we chiefly meet with two doubts; First of all, Whether it be poysonous: next of all, Whether it be rightly applied for the Cure of the Venereal Disease.

Whether Quick-silver be Poysonous.

Concerning the former Question, Whether Quick-silver be Poysonous, we have already treated before, in *tract. at. de Chym. & Aristot. consens. & dissens. cap.* 19. where we speak of Mercury, and we said there, That *Matthias Unzerus de anatom. spagyr. Mercu.* did endeavour to prove at large, That Mercury is not poysonous, with whom others also agree; especially those who urge Experience and the Authority of learned Physitians. *Avicen, lib.* 4. *Fen.* 6. *tract.* 1. *sum.* 1. *cap.* 2. writes, That Quick-silver doth not hurt many that drink it; for that with its qualities goes forth by the stool. *Haly Abbas lib* 1. *pract. cap.* 35. *Rhases in no. ad Mansor. de potu argen. vi.* do affirm the same. *Brassavolus* also doth testifie in *lib. de stirp. exami.* That he hath given Quick-silver to Infants to expel Worms. And *Fallopius de Metallis cap.* 37. holds, That Mercury may be taken into the body without the fear of any hurt; and he relates that Beasts do swallow quick-silver without any harm: For when they abound with Worms, which your Leeches know by their breath, if they swallow four several times half a Filbert shell full of Quick-silver cast into their mouths, they are cured, no worse Disease succeeding it. And he witnesseth that he hath given to Children in extream danger, whom other means have availed nothing, the quantity of two or three grains of Millet with evident success. The same Author, *de Morb. Gallic. cap.* 76. writes, That he saw a Woman which drank a pound of Mercury to cause an Abortion, yet without any hurt. *Matthiolus* also reports in *lib.* 1. *dioscorid. cap.* 170. (which also *Eustachius Rudius* relates, That he hath often observed, when he practised Physick there) That in the Town *Gorritiensis* the Nurses do give Quick-silver to little Children to drink in the

'Tis denied.

quantity

quantity of two grains of Millet for the Worms in the Belly, without any trouble at al. And the Midwives when great bellied Women lie long in labor, do presently give to drink a scruple weight of Mercury without any inconvenience: and *Georgius Agricola* relates, that a certain Woman did oftentimes fraudulently give Quicksilver to her Husband that she might kil him, and nevertheless he continued healthful nay it hath been observed that some thirsty in the night, have in the dark taken up Vessels ful of Quick-silver instead of drinking Cups, and with a wide Throat have taken of the Quick-silver in a great quantity, yet have cast it forth again by the stool without any hurt. And *Eustachius Rudius, add Lib. 5. de Morb. occult. cap.* 15 that he hath seen this, and that others have observed it, that some bodies have been dissected, in which no smal quantity of Quick-silver hath been collected in the Cavities of the bores, from the unction in the French Pox, who notwithstanding have lived many years after the unction. Which seems not possible to be done, if it were poyson by Nature.

'Tis affirmed. But *Galen, Aetius*, the reconciler, *Cardan, Fernelius, Ferdinandus Ponzettus, Jul. Palmarius*, whom I alleaged in the quoted place *cap.* 19. *de. consens. et dissens. Chymic. cum. Aristotele.* do differ from these. And experience it self hath brought most eminent men into that opinion, by which it is evident, that quicksilver doth no less cause numnesses, convulsions, tremblings, palseys, epilepsies, apoplexies, syncopes, than other poysons, nay sometimes death it self. And some do report, that they are seldom long lived, who digg up the veins of quicksilver; and though they be very strong bodied, and of the best temperament, that they can scarce hold out in that work to the fifth yeare, but by drawing in the venenate vapors they are taken with a trembling of al their parts.

The Authors opinion. And the opinion of these we think altogether more consonant to truth as being that which is confirmed by experience it selfe: but as concerning the experience of those, who write that quicksilver hath often been drank and given without any hurt, that doth not excuse quicksilver from its venenosity. For to the compleating of an action, there is required a right application of the agent to the patient, and some stay, which whenas it was wanting in the alleaged examples, the quicksilver could do no hurt for quicksilver is given either alive or prepared, if it be taken alive tis 'less hurtful, for whenas quicksilver is a body most exactly mixt, and the least parts of it do most pertinaceously cohere to one another, from whence also 'tis continually moveable, whiles it is whol and alive it brings little or no dammage to our body, but presently is cast forth by the stool. For in like manner as a leaden, or other mettallick bullet, if it be swallowed whol is presently cast forth of the body, and brings no hurt, but if it be resolved into the least parts, and contract rust, may do very much mischeif, as that history concerning lead doth sufficiently teach us, which *Fernelius* recites *de lue Vener. cap.* 7. So also if quicksilver be taken whol, moveable, and coherent to it selfe, and by reason of its mobility be presently again cast forth of the body, it brings no dammage; but if it be resolved into the smallest particles, and especially with the admistion of salts, and by their help be as it were fixt to the body, and penetrate into it, both inwardly and outwardly applyed, it causeth most greivous evils, as sublimate and precipate do sufficiently teach us, neither is there any reason for any one to ascribe that corroding faculty to the salts mixed; for there is no salt in the fume which exhales when Silver is gilding over, and yet that very fume is highly hurtful; neither can so little salt as is mixt with sublimate or precipitate, cause so great hurt, whenas salt though it be given in a great quantity, doth no such thing.

Mercury prepared. But as concerning prepared mercury, I know indeed, with how great prayses some do extol mercurial medicines. Some cal precipitate the angelical powder, and otherwise prepared mercury of life. Some commend the flowers of mercury of which we spake in *consens. et. dissens. Chym. p.* 365. others mercurius dulcis, and so highly, they write if it be rightly prepared and given 'tis as gentle as manna, tamarinds, cassia, and therefore they use it in the slightest diseases, which might easily

sily be taken away by more benigne medicines. But these commendations are too much, neither is their rashness commendable, who give quicksilver in any disease, whenas we have every where examples of them, who by the use of the medicaments, have not only been cast into danger of their lives, but have plainly perisht by them. Whereupon *Guish. Fabricius* in *Epist. ad D. Doringium lib. 3. observat. annexa.* thinks that that called mercurius vitæ may somtimes be called mercurius mortis, and mercury of life eternal. And how much mercurius dulcis, which is counted the gentleft of al, may somtimes prejudice, was said in the alledged place; but that quicksilver may somtimes be given without any dammage coms to pass, either becaus 'tis crude, or retaines the nature of that alive: and therefore as was said even now, can work little on our body, of which sort is mercurius dulcis, and the flowers of silver mercury, or becaus it is in its kind fixt. For as whol mettals though they be taken into the body, they do not affect it unless they be resolved, so so also whenas fixt mercury doth as it were put on the nature of fixt mettals, so it doth not hurt, as that which is stil volatil, and can easily insinuate it self into the body.

In what disease prepared Mercury is to be given.

Yet prepared Mercury ought not rashly to be used and be given in every disease or body especially at the beginning, but in those only in whom there is great store of vitious humors, which that may empty, and where the body is strong, for as *Mercury* sublimate and precipitate outwardly applied in sordid ulcers, doth mundefie them, and toucheth not the sound flesh as long as there is any filth, but if it be layd on the sound flesh it eats that: so also if quick-silver taken into the body do find corrupt humors on which it may work, it doth not easily damnefie the more inward parts, but it workes upon the humors, and causeth that they be emptied; but if there be no such humors there, it also assailes the sound parts. But whenas Quicksilver given inwardly is not used onely for the Venereal disease, but to drive away many other diseases, we wil speak no more of that here; but let us now inquire concerning it, whether it can, and how it may do good in the Venereal disease.

Whether quick-silver be to be given in the cure of the venereal disease.

As concerning one of them therefore, to wit whether quick-silver ought to be given in the French pox, and whether it may be safely, and by what vertue it acts, Physitians do very much differ. *Epiphanius Ferdinandus* indeed, *Histo.* 17. thinks that amongst ninety Authors that have writ of the Venereal disease, that there are onely foure, who have disallowed of the use of Quicksilver in this disease, viz. Casparus Torellus, Montanus, Minadous, and Fracastorius, but there are many more, which *Johannes Baptista Silvaticus* doth recon up *Contr.* 34. which *Silvaticus* himself is in the number of those, who denny Quick-silver to be an enemy to the essence of the french pox. For *Ulericus abbuten*, a German knight and Physitian *Cap.* 4. *in lib. de morb Gall:* writes that in his time scarce one in a hundred that was anoynted with Quicksilver did escape a relapse, the benefit of it lasting but for a few dayes. *Sebastianus Aquilianus lib. de morb. Galli. Cap.* 4. Cals the cure of this disease performed by quicksilver, sophistical, and writes that al anointed with it in his age suffered a relapse. *Gaspar Torelus* bishop of *St. Justa*, in his declammation against unction with Quicksilver, cals it a pernicious medicine and thinks it is to be shunned as the plague. *Joh. Baptista Montanus*, tract. de morb. *Gal.* writes that quick-silver doth indeed repress the disease for a certain time but does induce an evil quality in the part, and in no wise remove it, wherefore in process of time, al things become worse then they were before. *John Fernelius lib. 2. de abdit. morb. caus. cap.* 14. writes that he beleves nothing less, then that a medicine made of Quick-silver can cure the Venereal disease, since that in his judgment it only takes away the simptoms, leaving the root behind. *Victor Favintinus cap. 7. de morb. Gal.* thinks the cure of the disease with Quick-silver is false, deceitful and daingerous. Neither does *Fallopius* magnefie this cure, as appeares by his book *de morb. Gall. Cap.* 76. *Bernardus Tamiranus* also hath openly condemned this cure *lib. 2. de morb. Gall. cap.* 13. as also some others: to whose opinion

The negative opinion

as I said *John Baptista Silvaticus* joynes himself, and writes that he doth not beleeve, that quick-silver can wholy cure this disease, and that tis an antidote diametrically repugnant to the Venereal evil: he doth not deny indeed that this medicine may allay some evil and vehement accidents of the disease, but that tis diametrically adverse to the essence of the french pox, which is an occult property, inimicous to the liver, and that it can overcome that, he doth not beleeve. But though at the first rise of this disease, Carpus the Chyrurgion first made use of this medicine (whome perhaps that barbor followed, whom *Fracastorius* makes Mention of) being moved by this reason, because he had observed that the ancient Arabian Physitians did make use of Quick-silver against the contumacious scab, and many other rebellious diseases of the skin; yet experience hath no way confirmed this remedy as the best, and therefore it hath been rejected by many physitians: for if Quick-silver were one of the antidotes of this disease it would have alwaies and every where answered the expectation, and there had bin no need that more effectual remedies should have been sought for from the remotest Countries beyond the Seas, which have hitherto been used with most happy succes, that no man doth any farther doubt of their efficacy in this Disease; and though Quick-silver doth heal French Ulcers, yet it doth not follow, that 'tis an Antidote against the Virulency of it as neither those Medicines, which heal Buboes, or Carbuncles in the plague, can for that reason be accounted for Antidotes. *Aurelius Minadous* agrees with these, *Lib. de Virul. Vener. cap.* 39. Who wholy rejects the use of Quick-silver in this Disease, moved thereunto by three reasons; the first is, because he never saw any restored to health by the use of it; on the Contrary he hath rather observed many that by the use of Quick-silver have sufferred worse Symptomes in so much that they have affirmed, they have received greater dammage from the supposed Remedy, then from the Disease: the second is, that Quick-silver is hurtful by Reason of its excessive coldnes: the third is because no body can explain, after what manner Quick-silver doth good in this Disease. To which some add a fourth Reason, that of it self it is poyson; and a fifth that many have died by the use of it.

The affirmative opinion. On the contrary many other Physitians do very much commend the use of Quick-silver in this Disease: and that I may now pass by others, *Epiphanius Ferdinandus, Histor.* 17. writes that he can make good by Oath, that he hath perfectly cured, leaving no evil Symptomes, a hundred and fifty people Frenchified of al Ages; Sexes, and of diverse Temperaments, and at divers seasons of the year; and he names another most experienced Physitian, *Johan. Laurentius Protopapa*, who hath affirmed to him by Oath that he hath cured above a thousand men Frenchified with the Mercurial Unguent with most happy succes, and he writes that we ought to give God thanks, that he would make known so wonderful a remedy for so great a disease.

The Authors Opinion. That we may quit our selves of this difficult controversie, First of al we think the use of Quick-silver is not wholly to be rejected in the Cure of this Disease, neither do the reasons alleaged before by *Minadous*, or others evince it: for first of al as concerning experience, here one experience may be opposed against another, and there are many Physitians who taught by experience it self do with wonderful praises extol Quick-silver in this Disease. The Second reason, that Quick-silver is to be rejected because it is cold, is false, for the effects of Quick-silver as was said before, do teach us that it is rather hot then cold. Thirdly, concerning the manner how it works, and cures this Disease, we shal see hereafter. And though that manner could not be found out, yet the experience must not therefore be denied; for there are many Medicines that work by occult qualities, whose manner of acting cannot be perfectly explained. Fourthly, though Quick-silver be poysonous yet 'tis not therefore wholly to be rejected in this disease, whenas other venenate things come into Physical use, as opium, Cantharides, Oyl of Scorpions and others. But Fiftly whereas some could not be cured by mercurial Medicaments, this is not to be

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ascribed to the quick-silver, but rather to the ignorance of the Physitian, who did not rightly apply this Medicine, or to the negligence or disobedience of the patient, or to the vehemency of the Disease, which could be overcome by no Medicine, though the best that is.

When quick silver is to be used in the Venereal Disease.

But as quick-silver is not wholly to be rejected, so we think it is not unwarily and rashly to be used, but only upon urgent necessity, to wit then when this disease could not be cured with Guajacum wood or Sarsaparilla. For we must come to the use of quick-silver for two causes especially, the first is when the Disease is so stubborn, that it wil not yeild to those usual Medicines: Secondly when there is something present, which doth not admit of the use of the Decoction of the wood and Sarsaparilla, especially the heat and inflamation of the Kidneys and Liver. And *Eustachius Rudius* writes *Lib.* 5. *Cap.* 15. that he hath cured some, who if they had used never so little of Guajacum, though corrected with cold things, were presently taken so with a heat of Urin, that an Inflamation of those parts arising, they have hardly escaped death; and therefore in such cases sometimes, wil we or nil we, we are compelled to make use of quick-silver, as the same *Rudius* speaketh; and that oftentimes may be done safe enough, so that he writes he hath anointed with quick-silver even infants infected by their Nurses at suck, and hath cured them.

Things prohibiting unction with Quick-silver.

Yet we must not come rashly and inconsiderately to this unction, but first of al we must consider, whether there be any thing present that doth prohibit it: for first of al unction with quick-silver is not admitted, when the strength is but feeble, and therefore in old men it seldom takes place. Secondly, if the body do stil abound with many vitious Humors, for then the qnick-silver doth not easily penetrate: and by a commotion of the Humors it causeth grievous Diseases and Symptomes, therefore the body must first of al be emptied. Thirdly, if the Air be too hot, and if it be dog daies. Fourthly, if the body be extenuated, if there be a Feaver, Ulcers of the mouth, and inclination to a quinsie; this kind of Medicine also is not convenient for them who before the French Pox, suffered numness, tremblings, Palsie, and pains in their joynts.

Whether Quick-silver be an Alexipharmacum of the Venereal Disease.

But that quick silver may rightly be made use of, we must first of al enquire after what manner it is to be given, and what it can performe, and do in this disease, on which busines the hinge of this controversie turnes. Where first of al we are not of their opinion, who think quick-silver to be an Alexipharmacum of this Disease. *Quercetan* indeed affirmes it in *Consil. de lue Vener.* where he writes that Mercury is the only true and sole Alexipharmacum of this Disease, especially if it be inveterate. From whom *Felix Platerus* doth not much dissent, who writes that Mercury by its occult qualities and propriety contrary to this disease, doth quel the Venenate quality of that disease, but this cannot simply be admitted, for when as there are three things in this Disease, first of al that Malignant quality imprinted on the parts dedicated to nutrition, and especially on the Liver, or an occult Disease; Secondly, vitious Humors, generated in the Liver evilly affected, and polluted by this Malignity: Thirdly, Diseases and Symptomes which are raised every where in the body by those vitious Humors, we do not deny indeed that Quick-silver may conduce somwhat to the Evacuating of the vitious humors, as shal be said here after, and hence also to the taking away of the Diseases and Symptomes which do arise from them; but that it doth overcome the malignant and virulent disposition it self, which is the property of an Alexipharmacum, is that which we deny. For first of al experience doth not confirm it, neither hath that Alexipharmacal vertue of Mercury been hitherto proved by any one, by any solid argument; but whatsoever it performes, it doth by salivation and violent purging, which is not the property of an Alexipharmacum, for otherwise al Medicines purging vitious Humors should be called Alexipharmaca. This rather is manifest, that some cured by mercurial Medicines, after a long interval of time

have relapsed into this Disease, that occult and Malignant disposition being left in the body. Secondly, that quick-silver is no Alexipharmacum, appears also by this, because 'tis no way friendly to our body, but rather hurts the brain, Heart, and other Members, and causeth most grievous Diseases and Symptomes in the jawes, which *Platerus* endeavors in vain to remove from Mercury, and to ascribe them to the virulency of the spittle. For thirdly, Quick-silver causeth salivation, not only in the French pox, but also in other bodies, which are not Sick of the French Disease, and besides hurts in the mouth, inflamation, Exulceration, Stinks, injuries of the Teeth, which is obvious for every one to experience and observe, but that is more consonant to truth, that quick-silver is to be numbered amongst Evacuating Medicines, whenas 'tis evident by experience, that by benefit of that, many thick, tough and virulent Humors are emptyed by the mouth, somtimes also by sweat, or other waies, and that it doth not much good in this Disease, unless salivation ensue: therefore when it is applied, it can be used only for this end, to evacuate virulent Humors, which being emptied, whenas the Symptomes caused by them do vanish, 'tis concluded by many, that it may be administred for the Mitigation of the symptoms, when as yet it doth only mitigate or take away the Symptomes by accident, the virulent Humors, on which they depend, being taken away. Which cure notwithstanding, as *Fernelius* is of opinion, is the cruellest of al, and so hard, that many would rather perish of the Disease, than be cured with so great danger, so bitter hazard: but that quick-silver may be applied to external and contumacious Ulcers, is known to every body.

How many ways quick-silver doth Evacuate.

But to evacuate vitious Humors it may be used three manner of waies; either to move by stool and vomit; or to cause sweat; or to cause Salivation and spitting. Concerning the giving of quick-silver to move by stool or vomit is already spoken before, and the Chymists are large in the praise of it; and do extol it with wonderful commendations: and *Crollius* calls Mercury the Balsome of Nature, in which there is both a vertue incarnative, and regenerative, which doth wonderfully renew, and purge from al impurities, and therefore cals it a divine Medicine: to whom *Beguinus* assents, who in *Lib.* 2. *Tyrocin. Chym. cap.* 3. writes that Mercury is the chiefest Alexipharmacum against al corruption and putrefaction: from whom though *Platerus* do not wholly dissent, while he teacheth, that this Disease may easily be cured by purging with Mercury, and truly in no long time, but very speedily, being scarce drank twice or thrice, from whence is raised a plentiful flux of the belly, and also vomiting, somtimes also sweat and Urin is provoked: yet he cannot deny, that it doth perform this by a violent irritation of Nature, and not without danger.

By stool and vomit.

'Tis to be given warily.

But I would have a Physitian rather timorous, than bold and rash in the use of this Medicine, for that which *Pliny* said was the poyson of al things, *Lib.* 37. *cap.* 6. that wil not spare mans body, but offends the stomach, Liver, Guts, and al the bowels, and is especiallly an enemy to the Nerves and brain: but though the Chymists affirme that being prepared it may grow more mild, and that it may not hurt, they precipitate it, sublime it, and prepare flowers of it, *Aquilam*, *Aurum vitæ*, and other things; yet though you expel Nature with a fork, she wil stil returne: for as it was said even now out of *Platerus*, it purges violently and not without danger: and as *Fernelius Lib. de lue Vener. cap.* 17. writes of this business, upon the giving of prepared Mercury, (doubtless he meant precipitate) presently from the compass of the whol body, Humors of al sorts break forth upwards and downwards, with so great force, and so violent, that the spirits being exhausted, and the strength wasted, the sick do either die presently, or lie some daies without strength like unto dead men: somtimes al the mouth is inflamed, and contracts a Gangreen, putrid Ulcers and very stinking, and somtimes the jaws swel, that the Patient for some daies is not able to swallow at al: although somtimes it work more gently, yet it purges violently enough.

But if it do work more mildely, either it retaines the nature of that which is crude, or being fixt it doth almost put on the nature of a fixt mettal: of the first sort is mercurius dulcis, of which *Angelus Sala* saith in the riper aged it works little, unless it be given in a great dose, to wit thirty five grains, and then it easily raiseth salivation; and that this is true a certain Physitian wel known to me, learnt to his cost and found it so by experience, as we have said *de consens. et dissen. cap.* 18. but if it be more fixt, it doth not move the belly; therefore it must needs be that it have a middle nature, if it ought to purge, that it may stimulate nature; where yet alwaies to hold that medium is very difficult. Yet amongst those medicines, we have nominated of prepared mercury, that which is called mercurius vitæ doth easily challeng the first place, so that I think it would be needless to make mention here of more medicines prepared out of mercury; but we must note this concerning mercurious vitæ, that it is no pure mercurial medicine, but there is conteined in it some part of antimony as appears by the vitrum and Regulus, which may be made out of the mercurius vitæ, but can by no art be prepared out of mercury alone, but that they may be made of antimony is wel known.

When it is to be given in the Venereal disease.

Yet when we are minded to administer mercurius vitæ, and other mercurial medicines, we must diligently consider *Mesues* rule, that it is a grane of wisdom, not to come to strong medicines, but where weak ones wil not satisfy. If therefore this evil be new and gentle which may be cured by gentler purgers, and by the decoction of Guajacum or Sarsaparilla, we must not rashly come to the use of quicksilver. But if the evil be stubborn and inveterate, and there be many virulent humors in the body, mercurial medicines may be given without danger: for then 'tis not easily to be feared, that it should assail mans body, when it hath vitious humors enough to work upon. And oftentimes necessity compels us to come to the use of quicksilver, and some do hope in vain, to affect the same buisines by weak medicines often repeated as by stronger taken plentifully at once. For experience hath long since taught us, that we do oftentimes spend our time in vain in such medicines given against pertinaceous diseases. On the contrary that strong medicines, and amongst them quicksilver, after once or more times taking, have happily overcome pertinacious diseases, whose cause was about the stomach, the cavety of the liver, the spleen, pancreas, the cal, and from thence was communicated to other parts.

Sweating medicines made of quicksilver.

Secondly out of quicksilver are prepared sweating medicines, to wit the white spirit of mercury, or the white or red oyl of mercury, one drop of which or two, are given to drink in treacle water and spirits of Guajacum, or some such like decoction to move sweat, as also other preparations and fixt medicaments of quicksilver: and in case that quicksilver performe that, for which end it is given, and move sweat, and discuss the vitious humors by it, 'tis not so dangerous a medicine.

Salivation by quicksilver.

The third way is by Salivation, and many indeed do place al their hopes of the cure of this disease in Salivation, so that *Platerus* writeth, unless that in the cure by quicksilver Salivation be raised by the use of it. And at last be supervenient, the cure doth not succeed, neither is it fitting so much to condemne the use of it and wholy to reject it for the faults which happen in the mouth in this cure, or for other accidents, amongst which convulsions are cheifly to be feared, which are wont sometimes to happen, if there be any great error committed in the use of it, whenas afterwards in the cure the faults of the mouth are easily corrected again. On the contrary *Fernelius de lue Vener. cap.* 6. doth exactly set forth this manner of cure and describes its inconveniences: so great saith he is the cruelty and harshnes of this unguent, that the patient presently begins to languish the second or third day; for by its extraordinary tenuity it doth melt and dissolve, whatsoever is in the superficies and whole compass of the body, and at length by its extream cooling faculty with which it is endued, it drives them to the inward parts, from thence into the stomach and breast, from which afterwards it drives them upwards by a continuity of parts to the throat and mouth, with so great and so violent an injury, that the teeth, to which as also to the brain 'tis peculiarly an en-

emy, do in al presently, grow loose, and in some become blackish and al drop out. Some things it discusses out of the body by sweat, some by its purgative faculty it casts forth by stool, with a great deal of torture. And breifly to comprehend al, al certainly who are thus cured have their jaws exulcerated, their tongue and pallate swollen, their gums and teeth loose, and spittle runs through their mouthes without any intermission, smelling worse then any stink, with so great contagion, that the lipps by touching of that contract ulcers, and the cheeks are ulcerated within: the stomach being cooled and disturbed with the stink, the sick are destitute of any appetite to meat, and being tormented with intolerable thirst, yet they are scarce able to drink, their whol mouth being but one ulcer. Besides their tongue stammers, their eares grow deaf, in some incurably. Al the house about stinks.

When unction with quicksilver is to be used.

And indeed that manner of cure is bitter enough, that one ought not easily to admit of it, and therefore 'tis not be used when the evil is new and light, but when 'tis inveterate and contumacious, and when other remedies as the decoction of Guajacum, Sarsaparilla, and the like, have first of al been tryed in vain; neither must we come to the use of that unless the body before be diligently purged, least too great a quantity of virulent humors be turned rushing to the mouth and jaws; neither is this cure convenient for old men, nor for weak bodies, nor those that are wasted, and are sick of a weakness of the nerves, and have weak heads, and subject to distillations, least by the quicksilver, it being hurtful for them, these parts be more debilitated.

Therefore as *Hercules Saxonia de lue. Vener. cap.* 39. writes of this subject, they are neither to be approved of who use mercurial unctions without any difference, neither must we hold with them, who wholy reject the use of them. For somtimes this disease is so contumacious, that 'tis not cured with the decoction of Guajacum taken fifty dayes, and twice or thrice a day, but grows worse; whenas therefore the patients are weary of taking any more decoctions, and also of sweating, and hungring, that they may not be left without al help, 'tis better to administer a dangerous remedy then none at al.

How quicksilver doth raise a flux.

But what way quicksilver doth raise salivation, Authors do differ, *Eustachius Rudius lib. 5. de morb. occult. cap.* 15. disputes at large of this business, and first of al he worthily derides them who hold that quicksilver by its most intense coldness, or repressing faculty doth repel the humors from the external parts into the innermost parts of the body; for repelling thinges are of thick and dry parts but quicksilver is of most thin parts: neither do other repelling medicines, nay not the most cold ayre, or coldest water, performe any such thing; neither can here be given any reason, why the repulsion should be to the mouth, and not to other parts that are neerer. This therefore must be inquired, why quicksilver is moved to the head, and is cheifly purged through the mouth. Many are of opinion, neither doth that displease *Platerus*, that quicksilver doth cause spitting by a peculiar vertue: but he explains not the manner; neither doth this please *Rudius*. For saith he if quicksilver be moved to the head by vertue of its whol substance, and by a peculiar property, it doth that either by a similitude or contrariety of substance; it cannot be by a similitude of substance, because quicksilver doth rather hurt, then befreind the brain and nerves: and therefore as cantharides do invade and offend the bladder, the Sea hare the lungs, so also in this manner quicksilver seems to assault the brain. But *Rudius* overthrows that opinion two waies, first of al, because he hath proved before mercury, to be no poyson, secondly because he thinks he is able to render a reason from the manifest qualities, why quicksilver doth assault the head; where first of al, he supposeth this that mercury as opium hath heterogeneous parts and that 'tis made up of parts of a different nature, yet so, that the hot parts do predominate; and that 'tis compounded of an aery and earthy substance but very much attenuated with heat, which like unto smoak scarce enduring the heat, flyes away in fume and is dispersed. Therfore amongst al other medicines of this faculty it doth most powerfully extenuate the humors, discuss, and convert them to motion,

and

and therefore doth purge by sweat, by stool, by the mouth, and so partly by its purgative vertue, partly by the heat of its thin parts doth draw the humors along with it, and that it happens so, that the thinner going to the skin are emptied by sweat, but the thick and unfit to be emptied by sweat, being extenuated together with the quicksilver turnd into vapor are drawn up into the head and then causing distillations do fal down again; and at length he concludes, whenas quick silver outwardly anointed doth not remain in the stomach, as other purging medicines do, but assails the head; 'tis no wonder if it principally purge by the mouth.

But indeed he doth not this way satisfie the doubt, and this is a great peice of ignorance both in things phylosophycal and Chymical. For first of al that Quick silver cannot be cleared from venenosety, was said before, and proved, and the reasons for the contrary answered. And *Rudius* himself in the chapter even now alledged, reckons up so many and so greate evils, which mercury doth cause, that they cannot al be reduced to manifest qualities: which that I may compendiously reduce, Quick silver hath a corroding faculty, causeth a trembling and weakness of the heart, hurts the animal faculty, weakens the substance of the nerves and their proper unity, whence are raised incurable tremblings and greivous torments, and many using of mercurial medicines, have suffered convulsions, falling sickness, and apoplexy. Nay the same *Rudius* reports that some after unction have fallen into raving and madness: but whereas he endeavors to reduce that operation of mercury by which it causeth salivation, to the manifest qualities in that he laboures in vain, for first of al there are no such heterogeneous parts in mercury as he phansieth, as was said before, neither could any Chymist ever yet show them, and whether Quicksilver be burnt, or whether it be reduced to water, or what other external forme soever it puts on, it retaines its whole essence, and with a litle labour may be reduced to its ancient forme. Besides *Rudius* renders no reason, why Mercury out wardly anoynted on the body, is rather moved to the head then to the stomach, and carries the humors thither with it: for whereas he thinks, that it is resolved into vapour and carried up into the head, tis fals, whenas it may be collected whol both in the mouth, and in other parts. *The hurts of Quick silver.*

'Tis more agreeable therefore to trueth, that quicksilver is offensive to the nerves and brain, as the tremblings which it causeth do sufficiently de monstrate, and therefore that it creepes up by the nerves to the brain, and carries the vitious humors thither with it, which together with the vitious humors whenas nature and the expulsive faculty of the brain doth expel, and cast down to the jawes, hence follows salivation: and quicksilver whether outwardly applied, or inwardly taken, stil creeps up to the head, and causeth much spitting. *Quick silver an Enemy to the nerves*

But there are divers wayes of using Quick-silver to raise a flux, to wit either 'tis outwardly applied to the body by unguents, plaisters, epithems and lavatories so called, by a girdle, by bracelets and Rings, by suffumigations; or tis taken inwardly, by al which ways not withstanding there is nothing else done, but that the Quick-silver may be reduced into the smalleſt parts that it may the easier penetrate into the body yet what way soever tis broke into peices, it keeps its nature, and the least parts are easily again united to one another and returne to their ancient corpulency, that it hath bin observed, that sometimes a great quantity of it hath bin collected in the veins, and cavities of the bones. *The wayes of using quick silver*

Yet the most common way of applying Quick-silver is by unction; but that unction may be performed rightly, sometimes are to be observed before unction, some in the anoynting, and some after unction, before unction the body, if need require, must be emptied either with purging medicines or bleeding: for if very many vitious humors abound in the body, tis to be feared, that by the use of these unctions they rush together in a heap to the jawes and suffocate the patient, or being rapt up to the brain do cause an apoplexy, or palsie, and therefore first of al part of them ought to be emptyed. Also if their be plenty of blood, least the patient may *How the unction with quick silver is to be ordered.*

suffer

ſuffer an inflamation of his jawes or a feaver, tis good to take away a little blood. *Falopius* alſo, that part of the matter may be conſumed, the bowels ſtrengthened, and not be offended by the Quickſilver, gives the decoction of Guajacum eight or ten dayes before unction.

As concerning the unction it ſelf, the baſis of theſe unguents is Quick-ſilver, which muſt be choſen pure, or vivified by cinnabar, and it muſt be mixed with hogs-greaſe hens-fat, butter, oyl, turpentine that it appeare no longer quick to the ſight, which is commonly called mortifiying of it. Some alſo ad to ſix ounces of Quickſilver, four ounces of red ſugar. Some do mix divers other things to correct the malice of Quick-ſilver, and indeed this or that according to the different conſtitution of the diſeaſe, which notwithſtanding profit little. For thoſe oyly and unctuous things, or other things, do ſtick on the skin and ſuperficies of the body, and cannot follow the Quickſilver into the innermoſt parts of the body, nor correct its malignity. But thoſe things which are neceſſarily mixed, are mixt, to that end, that the quickſilver may be reduced into the ſmalleſt bodies and ſo may the eaſier inſinuate it ſelf into the body. Some alſo in the compoſition of this unguent, think we ought to have reſpect to divers things: and therefore *Hercules Saxonia*, if there be hard knobs, ads thoſe things which do mollifie, as the fat and greaſe of geeſe, ducks, the Marrow of oxe bones, butter, oyle of ſweet almons; if there be ulcers he bids us ad drying pouders, Franckincenſe, Myrrh, aloe, Litharge, white lead, which if they be il conditioned, he ads Cincabar precipitated. Beſides he commands us to mix medicines, which ſtrengthen, the parts: more over he bids us ad thoſe things, which do reſpect the principal parts, and thoſe that are moſt hurt, and therefore if the joynts be affected he bids us ad ground pine; if the liver, hepatick means; if the ſtomach, things ſtomachical, But beſides the reſt he doth aprove of oyle of Guajacum added to the ointment; al which as we do not wholy diſallow of, ſo they ought to be explained. Firſt of al, if the unction be ordered cheifly for tumors or ulcers, medicines may commodiouſly be mixed with it, but if ſaliva-tion and emptying by ſpittle be cheifly intended there is no need of that laborious compoſition. Secondly Quick-ſilver it ſelf if it be reduced into ſmalleſt parts, doth eaſily penetrate, neither hath it any need of helpers, and there is nothing that can penetrate eaſier then that. Thirdly I can ſcarce be perſwaded, that medicines out-wardly anointed, can penetrate to the ſtomach and liver, and ſtrengthen them; this likes me beſt, that he thinks oyl of Guajacum ought to be added to thoſe unguents.

How Quick ſilver is to be prepared.

The Quantity of Quick-ſilver that is uſed, is ſometimes more, ſometimes leſs, according to the vehemency of the diſeaſe, and the patients ſtrength. Yet we muſt not exceed ſeven ounces which is ſufficient for ſtrong bodies, in weak bodies 'tis ſuf-ficient to uſe three foure or five ounces; but every time uſe two or three ounces; of the unguent, or for every doſe take two ſcruples; in tender children for every place ſo much oyntment as is the bulk of a lentil is ſufficient. Such oyntments therefore may be made thus.

The quan-ty.

Formes of Mercurial Unguents. Take *of mercury ſix ounces; of hogs-greaſe without ſalt one pound; Kil the Mercury with the greaſe and mix it exactly, then ad of the marrow of an ox leg half an ounce; of Turpentine three ounces; of the oyl of it one ounce, of the oyl of Guajacum two ounces; mix them.*

Or Take *of venice Turpintine one pound, of Quick-ſilver ſeven ounces; mix them diligently, then ad of hogs-greaſe eight ounces; oyl of ſweet and bitter al-monds of each two ounces, pouder of cinamon two drams; Muſk ſix granes mix it and make an ointment.*

Euſtachius Rudius commends this form, which he uſed with moſt happy ſuc-ceſs for many yeares at Utine, in the great hoſpital of that City, with ſo much ſafe-ty, that not one of them periſht which he had in cure.

Take *ake of Quick-ſilver one ounce and half; Freſh Sows greaſe three ounces;*

pouder

pouder of mastick one ounce; oyl of mastick one ounce and half; Saffron half a dram; two Sweet apples of a middle size. First of al let the sows grease be most exactly mixed with the mercury, then ad the mastick finely poudered together with the oyl of mastick and Safforn, and afterwards the aples through ripe cleansed from the parings and core.

Or, Take *of mercury killed with spitle three ounces; old oyl four ounces; of Frankincense prepared as common mastick two ounces, mastick one ounce; hogs-greese two ounces and half; oyl of bayes one ounce and half; virgins wax two ounces; ointment of dialtbæa one ounce and half; sagapen one ounce; of wax as much as is sufficient. Make an Ointment.*

Or Take *of mercury two ounces; of hogsgrease three ounces; turpentine one ounce; pouder of orice frankincense, mastick each two drams; oyl of chamemel, white lillies, bayes of each two aunces; Stirax half an ounce; mix them.*

Or Take *of hens, hogs, and beares greace each one ounce; oyl of white lillies, bayes each two ounces; mercury six ounces; mix the greases in a morter, afterwards ad the mercury, and stir them an houre in the morter, then ad of frankincense mastick, myrrh, amoniacum, stirax, pouder of Arabick, lavinder each half a dram make an ungnent.*

The Places which are anointed are the joynts and the spaces between, and the less fleshy parts in the hands, elbows, feet, knees, sometimes in strong bodies the emunctories of the liver are anointed, and the backbone. *Fallopius* expects the hands, and first of al anoints the feet transversly about the begining of the feet, afterwards the spaces between the joynts of the leg, then the midle of the thighs, the middle of the Elbow bones, and the midle of the Armes, afterwards the whol back.

The time for anointing.

The most commodious time for anointing, is the spring and autum, the winter and summer are less convenient and the unction is to be performed in the morning, upon an empty stomach, in a close and warm place, beginning at the lower parts, and so passing to the upper unction is seldom ordered twice on the sameday.

The patient anointed must either be ropped up in linnen, or the parts anointed be covered with course flax or hemp and so the patient be placed in his bed.

How long unction is to be continued.

But the unction is to be continued so long, til salivation or a loosness, or some other evaccuation succeed; and the symptomes be lessened and cease; and truely if a loosness follow, it is not suddenly to be suppresst, yet we must have a care least the guts suffer any hurt, casting in by Clyster chaly beat milk, or the juyce of ptisan with milk, or the decoction of barley and afterwards if need require, come to astringent meanes.

Some think that sweat also ought to be moved; but if nature tend to salivation, tis not convenient to move sweat, least there be contrary motions caused; but if nature of her own accord tend to sweat, tis not to be hindered, yet unction is scarce to be continued above three dayes at one time; sometimes also there presently follow greivous symptomes as great ulcers of the mouth, swellings and inflamation of the tongue and jawes, the swallowing is hurt, the teeth loosened, an extraordinary flux of virulent humors from the mouth, a diarrhy or dicentery, and then we must presently forbear anointing, yet sometimes it hapens but very sildom, that no such greivous symptom followes. But only sweats, and pustles are multeplied al over the body.

What is to be done after unction.

When unction is now perfected, and the spitle runs wel, let the parts anointed be washt with wine, in which sage, Arabick, lavender, flowers, rosmary, grownd pine, bayleaves, calamint origanum have bin boyled, afterwards lay upon them some plaister for the nerves.

At last when the unction is past, we must use our endeavor, that the mercury be not left in the body, and that no evil be contracted neither in the mouth nor other parts; and therefore we must move sweat in a Laconick bath keep gold money in the mouth, shaveings of gold must be dranke, or bullets or pils made up of leafe gold must be swallowed: for the mercury is imbibed by the gold, and with it is emptied out of the body, and so al evil that might happen is prevented.

To

To asswage pain, the mouth and jawes must be washed with warme milk or the Decoction of Barley: to hinder inflamation let the patient use the decoction of plantaine or plantaine water, or of Vine leaves, with the syrup of Mulberries and dry roses, the teeth must be washed with the decoction of sage, or with Sage, columbine water, or austere wine; after unction we must not presently desist from the cure, but the decoction of Guajacum as being the alexipharmacum of this disease, must be drank stil for certain days, which if it be intermitted, a relapse is wont easily to follow upon it.

Mercurial plaisters. Secondly, emplasters made of mercury are wont to be applyed in this disease, which though they cause less trouble, yet they are less effectual to empty by spitting. They are prepared of the same matter of which the ointments are, to which also we may ad cinnabar: but quicksilver either is mixt with usual plaisters, as diachylum Ireatum, melilot, or new ones are compounded. The plaister called de ranis with mercury, is also in use. These plaisters are spred upon linnen cloth, leather, and are applyed to the same places as the ointments, especially to the hands and feet, also to the emunctories, and sometimes to the back bone, and they are worne continually night and day, and every third or fourth day are renewed: this cure is less troublesome, and upon faire daies the patient may go abroad, yet the cure is not so perfect, and therefore must be continued longer.

Lavatoris of mercury. Thirdly, Linnen clothes wet in mercury water, are applyed to the same places in the forme of an epitheme, and becaus sublimate is most commodiously dissolved in water, the same places which are wont to be anointed, are besmeared with mercury dissolved in this manner, which medicines are commonly called lavatories, which are prepared of mercurius sublimate one ounce, which is disolved in two pound of some liquor.

For Examples sake.

Take *of Mercury sublimate one ounce; of Scabious, Rose, Fumitory water, each eight ounces; Sage water four ounces. Let them boyl and be mixed.*

The use of it is this, with a cloth wet in this liquor, let the knees and feet be besmeared, and the armes from the elbow towards the hands, and that must be done in the morning and towards the evening, in a warme place and continued for ten days, til spitting follow.

Mercurial girdles and bracelets. Fourthly, Girdles and bracelets are made of Mercury killed with spittle and mixt with the white of an egg, which mixture is spred upon cotton, and that is sowed into leather or cloath, and of that girdles or bracelets are made.

Suffumigations of mercury. Fiftly, Also this disease is cured by suffumigations made of quicksilver, but this way of cure is more dangerous than that by unction, nay it hath been deadly to some, and therefore is not to be made use of, unless al other meanes have been tried in vain, and only on very strong bodies; for this way of cure is very violent, whenas the patients that do admit of it, every day are wont to voide ten pints of virulent spittle; but it takes not place in those that are weak, wasted, endewed with a hot and dry distemper, not in those, which are troubled with a difficulty of breathing, or are subject to distillations from the head on the breast, or who spit blood, or are taken with a lientery, or dysentery: but physitians do cheifly use those suffumigations in a contumacious French ophthalmy, and upon an imminent shedding of the haire, which cannot be hindred by other medicines; for this suffumigation doth fasten the haire. Yet then a particular suffumigation may be appointed.

Their difference. For we must note here, that there is a difference of suffumigations in this disease; for some are universal which are received by the whol body, and therefore also do empty the whol body; others particular, which are applyed only to certain parts: again some suffumigations are prepared of benigne medicines, as frankincense, myrrh, oyl, Cinamon, Styrax calamite, spikenard, Amber, Ammoniacum, benjamin, wood of aloes, Amber greese, Musk, Gallia moschata, and the like, which though they may be fitted for the use of certaine parts, yet they do not destroy the venereal disease. Those

Thoſe therefore which are proper to this diſeaſe, are chiefly prepared of mercury and of thoſe things made of Mercury, cinnabar, Mercury precipitate, ſublimate.

As concerning thoſe univerſal ones, their baſis as was ſaid even now, is mercury any way prepared; ſome ad the Greeks Sandarach, and yellow arſnick, but whenas they are moſt pernicious poyſons, they are not ſafe enough applyed, neither do they cure this diſeaſe in particular that we may give you ſome formes.

Formes.

Take *Of Factitious Cinnabar three ounces; Myrrh, Frankincenſe, Maſtich, each one ounce; Liver colored aloe, Styrax calamite, Benjamin, each half an ounce: make a pouder.*

Or Take *of Cinnabar three ounces; Myrrh, Frankincence, wood of aloe, Laudanum, Ammoniacum, each one ounce; mix them with turpentine, make pills.*

Or Take, *of Cinnabar three ounces, Mercury precipitate three drams; Frankincenſe, Aloe, Maſtick, Myrrh, Benjamin; Styrax Calamite, each half an ounce: make a pouder. Epiphanius Ferdinandus* reports the following forme is much in uſe at *Naples* in the Hoſpital for thoſe that are incurable.

Take, *of Litharge five ounces; of antimony, Cinnabar, each one ounce; of Pontick Rhubarb ſix ounces; Polipody of the oake three ounces. Sweet cane, Cinamon, Laudanum, Roſes, Mace, Nutmegs, Alum, Verdegrece, Aloe, each three drams; Red lead, the Greeks Sandarache, each one ounce. Gumme caranna, two drams; Water of Roſes and Citron Flowers, as much as is ſufficient, mix them according to art.*

But it ſeemes to me to be a forme made up without al reaſon which containes many things unprofitable, and alſo hurtful.

That is ſafer which *Ferdinandus* himſelf propoſeth.

Take *of Cinnabar, Mercury ſublimate each one ounce; Gumme of the Olive tree Laudanum each half an ounce; Nutmegs, Bay and Juniper berries, each three drams; Marjoram, Coppras one dram and an half; Turpentine as much as is ſufficient to incorporate it, make a maſs.*

The manner of preparing theſe ſuffumigations.

But thoſe medicines whether they be reduced into pouders, or pills or trochisks, are uſed after this manner: firſt of al the patient that he may be able to undergoe this cure (fit ſauce for him, and they are deſervedly thus handled who defile themſelves with luſt) you muſt give him two reare eggs, a morſel of bred dipt in ſtrong wine, and a draught of wine, and a ſpoonful of conſerve of roſes; then let him reſt quiet for a quarter of an houre; in the interim let that Venereal bed, or rather priſon, viz the ſweating place be heated, and in that hot houſe or dry bath prepare a tent, or a pavilion of thick linnen cloath, under which the patient may ſit naked in a low ſeat; under the ſame pavilion place a pot or veſſel ful of burning coales, on which by degrees caſt either the pouder, or the pills, or trochisks, that the fume from thence may be diſperſed through his whol body, and be received by the naked body of the patient; when the ſmoak abates, ſtrow freſh water on the coals, and continue ſo doing for a third or fourth part of an houre, for half or a whol houre, as the ſtrength of the patient can indure it. For we muſt carefully obſerve, that the patient faint not, which doth often happen; if it be collected by his ſtammering ſpeech, he muſt preſently be taken forth and be refreſht with fitting medicines. But that faintings may be prevented, the patient may be permitted to draw the cold ayre by intervals through a reed, and put forth his noſe without the pavilion.

But theſe ſuffumigations are applied either once or twice a day and indeed for three, ſix, or nine or more daies, according as the purgation doth ſooner or later ſucceed, for when this comes, or a looſneſs, we muſt preſently ceaſe from the ſuffumigation. After the patient hath ſweat ſufficiently under his tent. Being wrapt up in linnen he muſt be laid in his bed, that he may there continue his ſweat for an houre or two.

Particular ſuffumigations.

But particular ſuffumigations are not applyed to the whol body, but only to parts

parts exulcerated or affected with pain; but then Salivation is not moved, neither is that the intent, but it is used only to take away diseases and symptomes in the external parts, viz. for the falling of the haire suffumigatons are applyed to head; to the hands and Feet for their paines, and when they suffer Chaps and Clefts.

Internal Medicines causing Salivation. Last of al also a flux may be raised by taking Quick-silver inwards which though it was not known to *Fernelius*, yet it hath been taken notice of by the more modern, and Quick-silver is used to this end by *Rondeletius*, *Platerus*, and others. Such are those Pills called Barbarossa which have Quick-silver in them; but Physitians give Pills made of Mercury so, that at one dose there is given six or seven grains of Mercury, and they give them almost every day, and so long, til a flux followeth, and this cure they continue for thirty daies. Yet *Platerus* admonisheth that this kind of cure is not easily to be admitted, and not unless the Disease be inveterate, when other Medicines premised availe nothing. He also thinks that it is commodious, if it be presently cast forth by stool either by its own weight, or by the admistion of other things; but if that be done, doubtless it wil not cause Salivation; therefore 'tis better that Mercury what way soever prepared, be given in a less dose, than can cause purging either by vomit, or stool: viz. that the half, or third, or fourth part only of that dose be given, which otherwise is wont to be given to purge. For example sake, precipitate or Turbith Mineral is wont to be given at other times to vomit or purge to the weight of six grains, but if only three, or two, or one be given, by the continued use of it a flux is raised: and therefore he that would use such Medicines, shal do very right, if first of al he give the ful dose of the Mercurial Medicine to purge, the second day half so much, the third day a third part, the fourth day a fourth part, and continue so, til the spittle run, yet he need not so precisely observe it: and tis altogether safer in this disease to give those Mercurial Medicines, which do not move the belly with great violence, nor so great danger, yet by their continued use do provoke spitting.

CHAP. XXII.

Of the Diet to be observed in the Cure of the Venereal Disease.

Diet. The Air. A Diet in the cure of this Disease is strictly to be observed; first of al let the Air in which the Patient is conversant, be hot, that insensible transpiration may be free, and sweating be not hindred, but rather promoted, yet not so hot, as to make faint. Therefore if need require let the patient keep himself in a warm chamber the whol time of his cure, and let not him expose himself to the free Ayre, unless it be somwhat hot by reason of the season of the year, and then not before noon. Yet they whose course of life wil not allow them to keep at home, let them guard themselves with Cloaths against external cold, and as much as they can shun the cold Air.

The Meat. Whether a slender diet be convenient in the Venereal disease. As concerning their Meat, there is much discourse indeed every where in this Disease concerning a slender Diet: but whenas a slender Diet is that which doth in some sort impair the strength, or which doth little preserve the enfeebled strength, such diet is only convenient in acute diseases, which whenas they last not long, the strength also somwhat debilitated is able to hold out to the end of them: but whenas the French pox is a Chronical disease, and the Cure is extended for many weeks, if the strength be dejected by a slender diet, it cannot hold out till the end of the disease. But that Physitians do chiefly feed their Patients with bread and raisons, I think this is the cause, because they would give the most simple food, and that of good juyce: for whenas variety of meats doth easily supply vitious humors, and flesh, and fish, and the like meats are more easily corrupted, then bread and raisons

they

they prohibit the sick variety of meats and flesh, and would have them contented only with bread and raisons: therefore that course and form of diet is to be observed which may suffice for the conservation of strength, though not to encrease it, but must no way oppress Nature. The meat also must be of good juyce, and simple, and which no waies affords matter for the generation of excrements, nor may call away Nature from resisting the Disease to the concoction of that. And therefore the patient must not be allowed above two dishes, and meat must be given but twice aday; therefore when the sick is prepared for the use of Medicines, let his diet be such which may not impair his strength, but rather preserve it, nay, in some sort encrease it, that the patient may afterwards be able to undergo the evacuations that shal be ordered, and a more slender diet: but when Sweaters or Quick-silver is administred, if the strength wil bear it, we must use a more spare diet, lest the vertue of the Medicines be hindered by plenteous nourishment, and let the superfluous humors in the body be rather wasted, than heaped up, and let the passages by which they ought to be expelled, be al kept free and open: but let not the diet be too slender, lest the strength fail, but be able to hold out til the perfect cure of the disease, which is wont to be long first; and though somwhat is to be bated of the accustomary diet in the cure of this disease, yet that is not to be done presently at the beginning, nor that change is not suddenly to be made; but the first eight daies by little and little, somwhat must be substracted from the accustomary diet; as also the last eight daies of the Cure, by degrees he must return to the former course of diet; yet we must alwaies have respect unto the strength, and diligently consider what that is able to endure, and we must have a greater care of that, than of the disease, as without which the Cure cannot be perfected.

But how much concerns the quantity of the meat, we must also respect the strength, and the disease; for by how much the strength is stronger, by so much 'tis able to suffer the less quantity of meat; but the strength is demonstrated by the habit of the body, the temperament, custom, the age, season of the year, the Country, and condition of the sick; of which we have spoke in its proper place. In brief, as much as possible may be, somwhat must be bated of the accustomary food, which also the people of *India*, from whom the manner of curing this disease was derived to us, are reported to do; yet so, that alwaies respect be had unto the strength: For if the patient be strong, his Body of a cold constitution, that he can easily endure hunger; flesh is not to be given any more after eight daies, but the patient must be content with bread and raisons: but if the strength be weak, the body slender, cholerick, some flesh also may be granted, viz. the flesh of Chickens, Hens, Partridges, Veal, Kid, and tender weather, as also Hens Eggs: but Hogs flesh which is hard of digestion and distribution, and doth encrease the morbifick matter, is chiefly to be eschewed; as also corruptible Fruits, and soft fishes: and truly the most commodious Food in this disease, is raisons, and to be preferr'd before al other meats: besides, they do not easily putrefie, and they afford good juyce and nourishment, and correct the malignity of the vitious Humors; whence some are of Opinion, That Raisons in this Disease are not only meat, but medicine too; and especially those greater ones called *Cybebæ*, are most proficable, in which there is greater plenty of nourishment, and a more abstersive and strengthening faculty.

What kind of bread is to be given.

Concerning bread here is some doubt; many commend Bisket, nay admit of that only, which as we do not disallow of in strong bodies, which are moist and abound with flegm and excrements, being inclined rather to putrefaction, then adust, and in those who have strong teeth, and are accustomed to it: so also Bread once wel baked, and not too moist, may safely be permitted, as a nourishment most familiar to al Natures, Sexes, Ages and any season of the year: neither must we cause any trouble to the patient, by forbidding common bread, if he desire that rather then Bisket: nay Bisket seems to have its discommodities; for it staies longer in the stomach, and is not so easily disgested, and for the right disgesting of it there is need of a greater strength of the stomach, which notwithstanding for the most part in

thoſe that are ſick of the French Pox is very languid: beſides whenas in thoſe ſick of the Venereal Diſeaſe for the moſt part aduſt Humors do abound, by Bisket they are increaſed, on the contrary by common bread as being more moiſt they are made temperate, and at length more nouriſhment and good blood is afforded from it, as being beſt tempered, and in meats that which is beſt tempered, is to be preferred before that which is intemperate.

Many alſo do weigh out the quantity of the meat, and write that at one meale, four ounces of bread, and two or three ounces of fleſh wil ſuffice; but this cannot be ſo accurately obſerved in al men, but here there is no ſmal regard to be had to Natures and cuſtome.

Their drink. As concerning their drink, Authors alſo do not fully agree concerning that, ſome think nothing is to be given for drink but the decoction of Guajacum and Sarſaparilla, and wholly forbid wine, and think tis as much to be denied in this Diſeaſe, as in a pleuriſie, and are of opiniou that wine is not ſo much as to be taſted of, the whol courſe of the cure; and *Fernelius* writes that wine is ſo averſe to Guajacum, as tis to Hemlock, *de lue Vener. cap.* 13, But for this cauſe chiefly they forbid Wine, becauſe the body and Humors which before were aduſt, and which grow hot by the uſe of Guajacum, by the uſe of wine are inflamed. But indeed this reaſon ſeems not ſufficient; for that Second decoction may heat as much, as wine, if it be thin and dilute and moderately drank: therefore the ſtrength is here to be conſidered, and whenas wine hath a notable agreement with our body, and doth ſtrengthen the heart and al parts, and eſpecially the ſtomach, is moſt eaſily diſtributed into the whol body, doth moſt ſpeedily nouriſh, and ſo fortifie Nature, that it may the better be able to oppoſe the Diſeaſe; the uſe of it is not ſimply to be rejected, eſpeciallly in thoſe who are leſs hot, and have a flegmatick body ſtuft up with crude Humors; yet the uſe of wine is ſo to be moderated, that it do no way inflame the body; but thoſe that can abſtaine from wine without any hurt, let them drink that ſecond decoction made of Guajacum and that plentifully at meals, and other times, when they are thirſty, yet they to, may ſometimes take a drauft of wine to ſtrengthen the ſtomach. After the ſame manner if the Cure be ordered by Quick-ſilver, at that time when Evacuation is not yet made by the mouth and ſpitting, and the patient can chaw meat, he muſt be nouriſht with the beſt bread and good fleſh, and dilute wine muſt be given him: but when Salivation begins, and the Patient can chaw no longer, by reaſon of the looſneſs of his teeth, he muſt be nouriſht with ſuppings, and Barly Ptiſſan, and fleſh broaths with bread in it, and whenas an Inflamation of the jaws is feared, he muſt abſtain from wine. But after the cure is finiſht, though the Patient may reurne to his accuſtomary Diet, yet tis moſt convenient that he be nouriſhed with meats of good juyce, from which the beſt blood may be generated; for whenas the body is extenuated, and the veins emptied, we muſt wholly take care, that the body or Veſſels be not filled with vitious blood, but tis commodious that they be reſtored and filled with good. Neither muſt it be granted, that upon recovery he preſently ariſe from a ſmal quantity of meat, to a great, whenas al change to extreames is dangerous. And when it may be feared, that the Liver be heated by the uſe, of hot and dry Medicines, conſerve of Roſes, Violets, the pouders of the three ſaunders, Diarrhodon Abbat. muſt be given for ſome weeks; and let the courſes of diet, eſpecially in Summer time, be cooler, provided chiefly of Barley, the Whey of Goats Milk alſo is good. But if there be any fear, that ſome reliques ſtil and Malignant diſpoſition of this diſeaſe be remaining in the body,

Wine of Guajacum. give a Phyſick wine made with Guajacum and Sarſaparilla which is moſt commodiouſly prepared at vintage time, if to every Gallon of wine one pound of Guajacum, and three ounces of Sarſaparilla be added, and let cool with the new wine after the accuſtomed manner; but out of vintage time thoſe Medicines may only be ſteeped in Wine.

Sleep. Sleep is not only convenient in the night, but alſo a day times, when the Patients ſweat, it may be granted.

Al

Al violent exercise is hurtful; for whenas the strength is impared by it and there is a greater transpiration and dissolution of the body, thence it comes to pass, that the patient cannot be content with that smaller portion of nourishment, which is wont to be used, in this Disease. But he must wholly abstaine from Venery, as the greatest enemy to this Disease: let sweating in his Chamber be instead of exercise, and frictions which may be done with the same labor when the sweat is wiped of: let the affection of his mind be composed to mirth. *Exercise.*

We must use our endeavor that the belly be kept loose, and whenas by reason of the smal quantity of meat it is wont easily to be bound, it must be loosned with Clysters, and Raisons with leaves of Seny; nay by intervals to give some purgers is not only profitable, but also necessary: for though those Laxatives do empty the first passages, yet because they reach not to the more distant places, and by sweaters only the thinner parts are Evacuated, but the thick are left behind, tis good after seven or ten daies, or after a longer space, or need requires, to give a purging Medicine agreeable to the body of the Patient. *Excrements*

CHAP. XXIII.

Of the Cure of the Diseases and Symptomes, which are wont to be joyned with the Venereal Disease.

WHenas divers Diseases and Symptomes are wont to be joyned with the Venereal Disease, some are very large in explaining, what way those Diseases and Symptomes ought to be removed: but whenas those Diseases are for the most part manifest, and we have treated of their cure in former Books, I think it not worth my pains to treat at large of them in this place: and therefore I shal only alleage certain few things, and those principally which are proper to this Disease, let the rest be fetcht from their proper places.

Ulcers.

As concerning the Ulcers of the Yard especially, which are very common in this Disease, we have spoke of them in general *Lib. 3. Pract. Part. 9. Cap. 11.* that we may add a little, the Root of the Yard being guarded with a defensive Oyntment, the Ulcer must be washt with the Decoction of Scabious, Horehound, and especially Soape-wort, and Guajacum: afterwards let the Ulcer be anointed with some convenient unguent; those Oyntments are chiefly profitable, which have Mercury in them, either a live, or sublimate, or precipitate, or Cinnabar. And in Ulcers of the Yard, and rottennes of the Nut, as they speak *Hercules Saxonia* writes there is no Medicine yet found out more profitable then precipitate: yet it ought not to be applied, but where there is a thick filth, but in clean Ulcers tis not to be used *Eustachius Rudius Lib. 5. de Morb. occult. Cap. 19.* commends two Oyntments especially. The first is: *The Cure of Venereal Ulcers in the Yard.*

Take *of Oyl of Roses, sweet Almonds, of each half an ounce; Oyntment of Rozin (which is made of pure oyl, Rozin of the Pine, Turpentine, and Yellow Wax) six drams; Mercury Precipitate, one dram; a little Wax. Mix al over the fire, except the Mercury precipitate, and taking them of the fire stir them carefully, til they are cool, then add the precipitate; yet according to the Nature of of the Ulcer, and the part affected with it, you may add more or less of the Mercury precipitate.* *The Mercurial Unguent.*

The

The other is this.

Take *of* Oyl *of* ſweet Almonds, Oyntment *of* Roſes, *of each three ounces*: *new wax, one ounce*: *Mercury precipitate half an ounce.* *Mix them.*

And thoſe Oyntments are good not only for the Ulcers of the Yard, but for French Ulcers of other parts, for the Diſeaſe called Ficus, ſwellings in the Fundaments, and Cruſts.

The Balſame of Mercury alſo is good, which is thus prepared.

Take *of Quick ſilver diſſolved in ſpirit of Nitre, to one pound of this diſſolution, pour of* Oyl *of* Olives, *three ounces. Let them ſtand and digeſt eight daies, afterwards ſeparate the oyl and keep it for your uſe.*

Or, Take *the Yelk of one Egg boyled hard, Honey one ounce. Mix them over a gentle fire, let them boyl, and add of Mercury Sublimate, half a dram.*

After mundification this Oyntment alſo may be uſed.

Take *of the beſt aloe, half an ounce*; *Crocus Martis, two drams*; *Frankincenſe, red Lead, of each one dram*; *Honey, half an ounce*; *Turpentine, two drams*; *the Yelk of an Egg. Mix them.*

Hidden Ulcers. But occult and hidden ulcers are wont to lie hid either bound up under the fore-skin, or elſe are in the internal paſſage of the Yard; if the Ulcer be under the fore-skin contracted, either a convenient medicine is to be injected by a ſyringe, and afterwards a tent dipt in oyntment is with a probe to be applied to the part affected or the fore-skin muſt be cut long waies, and neceſſary Medicines be layed to it.

Ulcers in the paſſage of the Yard. But if the ulcers be in the very paſſage of a mans Yard, they are hard to be cured, and have caruncles joyned with them, or fleſhy excreſſences, which hinder the emiſſion of the urine, therefore in a ſlight ulcer, we muſt inject Plantane water, in which Alum, litharge, and white Lead have been boyled, but in more grieous ulcers, uſe this Liniment.

Take *of Mercury precipitate, one ounce*; *Mercury ſublimate, one dram*; *burnt lead, two drams. Grind them on a Marble ſtone, waſh them often with Roſe-water, and let them dry in the ſhade. Afterwards take of Hogs Fat, ſix ounces*; *White Wax, two drams. Let them be diſſolved over the fire, and add the pouder, and two ſcruples of Camphire. Make a Liniment, which muſt be beſmeared over a Candle made of five ounces of White Wax, and one ounce of Turpentine, and let the Candle be put up into the Urinary paſſage: or let ſome convenient plaiſter wrapt over a ſmal probe, be thruſt in: the Caruncle being taken away a drying and conſolidating oyntment muſt be caſt in.*

In the womb But if there be an ulcer in the womb, and that ſordid and creeping, the evil is incurable: but the ſlighter are cured by injections of Alum waters, in which Guajacum and Sarſaparilla is boyled, or with peſſaries of the juyce of Plantane, with pouder of Aloes, Bole Armenick, white Lead and the like. In a very ſordid ulcer the Oyntment Ægyptiacum may be added, or ſome Mercurial unguent: and at laſt a drying and conſolidating Oyntment may be uſed, as that of Tutty, or the like.

In more grieous ulcers ſuffumigations of the Womb are moſt profitable, but whenas the Pipes are overheated by the coals, theſe candels of *Hercules Saxonia* are good for a fume.

Take *of Styrax, Calamite, Beniamin, of each ſix drams*; *wood of Aloes, ſeven ſcruples*; *white Frankincenſe, one ounce*; *Ladanum, one dram and an half*; *Orrice, Cloves, of each two drams*; *Damask Roſes. ſix drams*; *Cinnabar, two drams*; *coales of Willow, half a pound*; *Aqua Vitæ as much as is ſufficient. Make Candels.*

By the ſame Medicines the ulcers of the Guts are Cured.

Ulcer of the Jaws. But to the ulcers of the jaws whenas ſuch Medicines cannot be applied make a Gargariſme of the Decoction of Sarſaparilla, the bark of Guajacum, the Leaves of

of plantane, scabious, mittle, red roses, pomegranate pil, sumach, to which ad a little alume the decoction may be made in water, and towards the end ad a little austere wine; after they are washt, the ulcers must be clensed with oyl of sulphur, adding a convenient liquor, or the compound water of alum, which is thus prepared.

Take *of mercury sublimate, roch allum, each one ounce; Grind them on marble stone, then ad to them juyce of Lemons three ounces, plantane water one pound and an half; rose water nine ounces; Boyl them in a glass to the consumption of the fifth part.* *The compound water of alum.*

But you must have a care, that no part of such medicines be swallowed down; butter of antimony so called is very efficacious, if the ulcer be gently touched with a piece of cotton moistned with the butter; but there is need of the same caution here: but whenas it cannot alwaies be prevented, but somewhat wil slide into the stomach, and so such medicines cannot be given safely enough; but on the contrary, other more gentle medicines are of little efficacy, these ulcers are hard to be cured, nay oftentimes are incurable; the solution of gold is more safely applied to these ulcers, prepared after this manner.

Take *fifteen leaves of Gold, roch alume, nitere, Salt, each one ounce; grind them on marble, and poure to it some drops of spirits of vitriol; afterwards poure on it spirits of wine two fingers bredth above it, and let them stand in warm ashes, last of al boyl, that the leaves of the gold may be dissolved, and the spirits of wine grow yellow. Seperate the Spirits of wine by distillation, then poure more on again and digest it, and do this so often, til the spirits of wine dissolve the gold, and the salts be left at the bottom; at last seperate the spirits of wine by distillation till tis dry, and pour on spirits of turpintine and digest it eight dayes in a warm place, till the gold be dissolved, with this solution wash the part affected twice every day.*

Ulcers of the nose are cured by errhines, or infusions, by pouders strewed on it, by suffumigations made of Guajacum and cinnabar. *Of the nose.*

Clefts of the hands and feet.

If there be chaps and clefts in the palmes of the hands and soles of the feet, let them be washt with the decoction of Guajacum, its barke, scabious water, germander, cinquefoile; and if there be hardness with it, take also marsh mallowes, or the root of wild cowcumber, afterwards use an ointment of butter, goose-grease or hens, ammoniacum, bdellium, apples, to which ad a little of unslaked loome, or precipitate, or the oyntment proposed before. *Clefts of the hands and feet.*

Or Take *of hogs-grease as much as you please, and put as much oyl of tartar to it, that by it the oyntment may be made sharpe.*

If the evil yeeld not to these, apply a particular suffumigation of cinnabar; *Hercules Saxonia de lue vener. Cap.* 30. writes that he hath observed a certain woman who for eight years together had clefts in her hands, and had used the help of al the Venetian and Padua doctors to no purpose, was in a short time easily cured with the juce of an herb, which some cal mugwort, others tansie, being carefully dropt with a feather into al the clefts, and forbearing to wash her hands at al, and that he hath found the same juyce profitable in ringworms and Crusty Ulcers.

Buboes.

Concerning buboes which are wont often to break forth in the groines in the Venereal disease, we must hold fast this in general, that we do our endeavor, to help the expulsion of that matter, which nature assayes and indeavors to thrust forth to the more ignoble parts; whenas sometimes by this evacuation nature is wont to free her *The cure of buboes.*

her self from al that disease; therefore if a buboe break not forth enough, and increaseth but tendeth not to suppuration, we must use our endeavor to draw it forth and suppurate it. Therefore the thigh of the same side must be rubbed, and scarified about the lower part, or else a vein must be opened about that place; but on the bubo it self there must be layd strong drawing medicines. As,

Take *of sagapen, Ammoniacum each three drams; opoponax, Bdellium, each two drams; mustard, pepper, Pellitory of Spain of each one dram; blacke sope half one ounce; mix them and with wax and pitch, make an emplaster.*

Yet if nature be oppresst with the plenty of virulent matter, that it cannot expel it al, then 'tis good to give a purge, that part of the burthen being taken off, nature may the easier expel the rest.

When the tumor hath broke forth enough, we must take care it be speedily opened, and be kept open a long while; that it may suppurate we must lay on it those maturatives, which are wont to be applied in inflamations, of the mucilage of mallows, marsh-mallows, wheat and flax seed, figs, hogs-grease, goose-grease, and the like; or the simples diachyled, or that compound with gums; when 'tis mattered, we must not expect that the bubo should open of it self, but it must be opened betimes, least the virulent humor detained there do hurt other parts; the tumor being opened the forementioned digestives and abstersives must be layd on, to which there will be need sometimes to ad a little of mercury precipitate, and the ulcer must be kept open a long time.

Yet in cold buboes there is no such feare, that the matter should ascend to other parts, but if purgers and sweaters, and proper alexipharmaca be applied, sometimes the bubo doth wholly vanish without any danger.

Gummosities and Nodes.

Truely Such tumors and nodes, which do rise in places void of flesh, as the forehead, the skul, and the outward part of the legs, do oftentimes vanish, if the disease be perfectly cured; especially after the use of sarsaparilla, which is most effectual in discussing of these diseases; and after the use of mercurial unctions, which are applied to such tumors yet if after the cure is inded such tumors and nodes remain, things emmolient, attenuating, and digesting must be laid udon them, and that are strong, as the roots of wild cowcumber, bdellium, sagapen, opoponax, and cheifly ammoniacum, or diachylon with gums, or a mercurial cerote; this is good and proved by experience.

Take Of the plaister diachylum with gums one ounce; simple diachylum half an ounce; mercury killed with spittle one ounce, oyl of guajacum as much as is sufficient make a plaster.

Or, Take *of Ammoniacum, Opoponax, Gume of ivy dissolved in aqua vitæ, hens and goose grease each one ounce and half; the marow of a calfs leg one ounce ladanum, styrax, calamite, and liquid each two drams; the pouder of hermodactil roots orrice, each three drams; cinnabar one dram; quick silver mix with turpintine six drams; oyl of lilies and wax as much as is sufficient, make a cerote.*

Also the lavatories made of mercury, mentioned before, are good in these tumors.

If these things do not satisfie, the tumors must be opened with caustick, especially if they be not in the joynts, nerves, tendons, and the place must be kept open, and the bone underneath, which for the most part is hurt, must be scraped.

Smal

Smal Bunchings and pustles.

Bunchings also and smal pustles, thymi, verrucæ, favi, as in other parts of the body, so especially they are wont to rise in the head, about the arsehole, yard and privities in the french pox: which though sometimes after a universal cure they vanish of their own accord, yet sometimes also they require a peculiar cure. *Bunchings and pustles.*

This sort of bunchings which are in the head, must be washed often with the decoction of guajacum, and cheifly of the barke of it and sarsaparilla; some use oyl of scorpions and vipers: to which if they yeeld not, they must be anointed with some mercurial unguent, or the compound water of allum, prepared of roch allum and mercury sublimate, which some also prepare thus.

Take *Of roch allum, Mercury sublimate each two drams: grind them, ad of plantane and rose water each one pound: Boyl them in a glass to the consumption of half, afterwards let them stand fifteen dayes that the allum and mercury may sink to the bottom, and let the cleare water be poured off, and kept for your use.*

If the pustles be in the mouth, use washing of the mouth with the decoction of guajacum, or if there be an inflamation, with chalybeate whey, to which may be added roses and plantane; and if the pustles be foule, ad scabious and ten graines of alum to every pint of the whey or decoction. The compound alum water even now described is most profitable; yet in pustles of the mouth, tis not safe to use that alone, but it must be diluted with a treble or quadruple quantity of rose and plentane water. But the pustles of the arsehole and yard, must every day be often fomented with a linnen cloth wet in the decoction of guajacum and sarsaparila; for the same the alum water even now described is very good: or if the evil be stubborn, some ointment must be laid upon them, with pouder of precipitate, such as were proposed before, or precipitate mixt with foure times as much of the white of an eg; wch layed upon such excrescenses of the arsehole, in 24. houres space extracts and roots them out: afterwards drying and cooling things must be layed on. Some cut off the french warts with Scissers, and afterwards take out the root with the medicines even now proposed: also if the extream part of the wart be toucht with oyl of vitriol, it dries up and falls off.

Falling of the Hair.

The falling of the haire wich is joyned with this disease, doth happen rather from the knawing off, of the roots of the hair, than from other causes, both in the head and beard which that it may be cured, generals being premized first the hair must be shaved off, if the patient wil allow it: for al do not admit of it, especially religious men, whose diseases must be kept private as *Herculer Saxonia* writes *de lue Vener. Cap.* 38. then astringent things must not be used, by the use of which the evil is made worse, and ulcers and paines of the head do follow upon it the matter being retained: but those things rather are to be used, which do discuss and clense away that vitious matter which eates of the haires: as a lye in which have bin boyled Guajacum and its bark, sarsaparilla, leaves of fumitory, berony, scabious, southernwood, wormwood peny royal, asarabacca, agrick: and if the skin be dry, mallows marshmallowes, pellitory of the wal must be added: then the other medicines must be applied, which are propounded *lib. 5. pract. par. 3. sect. 2. cap. 3. and 4.* al which if they satisfie not, particular suffumigation for the head and face, must be prepared of quick-silver and cinnabar, by which remedy in the space of six or nine dayes, the falling of the haire is stayed. But for the most part, if universal purgers, and emptiers be applied, and the matter knawing the haires be taken away and proper lotions be used, afterwards haire doth succed of its owne accord in the place of that that fel away, see more in the place alledged *de Alope. et Capil. defluv.* *Falling of the hair.*

Pains.

The Cure of pains. Also most grievous pains do often afflict those who are sick of the Venereal Disease; but they are most commodiously taken away by medicines proper to this disease: but Sarsaparilla is chiefly good to take them away; therefore if the pains be very urgent, on the first daies you must take a greater quantity of Sarsaparilla, and a less of Guajacum: and though the matter being dissolved and melted, the pains be encreased til the second week, because Sarsa hath an extraordinary attenuating faculty, without any astriction of the bowels; yet we must not desist from the use of it, but the patient must be told of it: afterwards when the pain is ceased, we may encrease the quantity of Guajacum, and China Root may be added also to mitigate those pains: but by intervals, almost every week, give proper purging medicines; but to the places pained apply fomentations of Guajacum, Leaves of Penyroyal, Sage, Rosemary, Chamomel flowers: Oyl of white Lillies also, of Rue, Scorpions, Vipers, Guajacum, are good: if the pain be very urgent, we may give also Laudanum Opiate. Upon the use of al which, if the pain depart not, those mercurial Unguents, which we propounded before in the universal Cure, must be anointed on the places pained; or by the addition of wax make Cerotes of them, and lay them on the parts pained, or some other plaisters above propounded; to which also may be added, Castor, Hermodactil Roots, Orice, and other Arthritical Medicines; especially *Vigo*'s Cerote of Frogs is of good use to lay asleep those pains: and this Cerot of *Platerus* is good too.

Take *of Quick-silver three ounces; stir it with one ounce of Turpentine washt with Aqua vitæ; adding Bears grease, the marrow of a Calves Legg, of each an ounce and half: Oyl of white Lillies, Chamomel, Dill, bayes, worms, or Foxes, of each half an ounce: Spike or Turpentine two drams: Euphorbium, Frankincense, of each half an ounce: Liquid Styrax six drams: Hermodactils two drams: Castor one dram: Wax as much as is sufficient. Make a Cerote.*

Also the aforesaid Lavatories prepared of Mercury, formerly propounded, applied to the parts pained, especially the Legs, do allay the pains.

The Running of the Reins.

The Cure of the Running of the Reins. The Running of the Reins, which also is frequent in this Disease, is not to be stopt at the beginning, nor rashly: whenas Nature doth endeavor to purge the virulent matter through that place, which if it be suppresst flies up to the Head, nay infects the whol Body: but if it do not stop when the decoction hath been used til the third week, let the Region of the Loyns, and Perinæum, be anointed with astringent Oyls, made of Mastich, Mint, Roses, Mirtle.

But let Medicines be given of the seed of the Chast-tree, Lettice, Hemp, to which add a double quantity of the pouder of Sarsaparilla: and those Medicines may be given either in the form of a pouder, or with Syrup of Water of Lillies, be reduced into the form of an Electuary. 'Tis good also if every day there be given two or three drams of Water-lillies, with one or two scruples of Turpentine: Some also do give for this Running of the Reins, green Mercury precipitate, or the Rozin of Guajacum and Turpentine, which is washt with Violet Water, and adding the Yolk of an Egg, and the Decoction of Sarsaparilla, 'tis reduced into the form of a Potion.

A Consumption.

A Consumption. At last it often happens, that either by the violence of the Disease, or the Cure not rightly ordered, the sick come into a deep Consumption: For the Cure of which, the common Medicines for a Consumption wil not suffice, but there is need of

of Specificks. Which kind of Remedy *Audovicus Septalius animadvers. Lib, 7. n.* 214. doth propound, and writes that by it, he hath wholly freed very many from this disease, and from such a Consumption. But 'tis prepared thus.

Take *of choice Sarsaparilla cut smal, six ounces; infuse it twenty four hours in fifteen pound of warm water, in a warm place, in a vessel shut: afterwards boyl it with a gentle fire till five pound be wasted: then with a spoon perforated take out the Sarsaparilla, and bruise it in a marble morter: then cast it into the same water again, adding two pound of lean Veal, Coriander seed prepared one ounce, or instead of it, so much of the shavings of Guajacum, or three drams of yellow Sanders sliced, according to the condition of the Patients body and humors: and the vessel being covered, let it boyl again with a gentle fire, till there remain five pound; and towards the end aromatize it with three drams of choice Cinnamon: then strain it, squeezing it hard, and keep it for your use in a glass or glazed vessel.*

Of which let the patient take in a morning four hours before meat, six or seven ounces; but in the evening three hours before supper, four or five ounces: And if it be Summer, or a Hectick Feaver is joyned with it, he adds of Barley excoriated or husked, four ounces: and he continues the use of this Medicine many dayes, sometimes to the hundreth day.

Let the rest be sought for out of the Cure of the particular Diseases, and out of *Fallopius de morb. Gal.* who hath writ at large concerning the Diseases and Symptomes which are joyned with this Disease.

F I N I S.

Mris. *Culpepers* Information, Vindication, and Testimony, concerning her Husbands Books to be Publisshed after his Death.

SO great are the *Afflictions wherewith our* Heavenly Father *hath been pleased to exercise me his poor* Handmaid, *that I have not only lived to see my* dear Husband, (*the* Stay *and* Solace *of my Life*) *taken from me: but it hath been my hard hap also to see his* Reputation, *and* Memory (*which wil be dear to al Posterity, for the works he hath written for the Common Good of this Nation*) *blemished, and Eclipsed, by the* covetous *and* unjust Forgeries *of one, who, though he calls himself* Nathaniel, *is far from being* an Israelite in whom there is no guile; *who was not content to publish a* Hodgpodg *of* undigested Collections, *and* Observations *of my deer Husband deceased, under the Title of* Culpeper's last Legacy; *but to make the Deceit more taking, he steeled his Forehead so far, and brased it so hard, as not to be ashamed to forge* two Epistles, *one in mine, and the other in my Husbands Name; of the penning of which, he nor I, never so much as dreamed: And yet he* impudently *affirmeth in my Name, that my Husband* Laid a severe Injunction on me to publish them for the general good, after his decease; and that they are his last Experiences in Physick and Chyrurgery. *And in the Title of his Book, he said,* They are the choycest, and most profitable secrets, resolved never to be published til after his Death. *Al which Expressions in the Title and Epistles, are as falf as the Father of Lyes; and every word in them, forged and feigned. And he knew wel enough, that no discreet, honest man, that was a friend to my* Husband, *or me, would ever have agreed to such infamous and dishoneſt practices; and therefore I desire all Courteous Readers of the Writings of my Husband, to take notice of this* Deceit, *and to assure themselvs that it never entred into his head, to publish such an undigested* Gallimoffery, *under the promising and solemn Name of his* Last Legacy, *and that* whereby he gained his Reputation in the World, *as the Impostor makes him speak in his forged Epistle. And I desire any in different Reader, that hath observed my* Husbands losty, and Masculine manner of expressing himself in his Prefaces, and Epistles Dedicatory, *whether in case he had been minded or disposed to take so solemn a farewel of the world, as the* Forger *makes him to do; whether, I say, he would have done it in such a* whining fashion, *and so in the Stile of a* Balade-maker, *as to say,* And now, if it please Heaven to put a period to my Life, and Studies, that I must bid al things under the Sun farewel: Farewel to my dear Wife and Child, farewel Arts and Sciences, farewel al worldly Glories, adiew Readers. *Certainly my Husband would have been far more serious, and material, in such a case, as any discreet man wil Judg. Neither can it be thought, that in such a solemn* Valediction, *he could possibly forget his wonted respects to the* Colledg of Doctors, *to whom he did so frequently address himself, in divers of his writings.*

Courteous Reader, *I shal say no more touching the abuse of the Book-seller, only to prevent (as much as concerns me) thy being abused for the future, know, That my Husband left seventy-nine Books of his own making, or Translating, in my hand, and I have deposited them into the hands of his, and my much honored Friend, Mr.* Peter Cole, *Book-seller, at the* Printing-Press, *neer the* Royal Exchange *(for the good of my Child) from whom thou mayest expect to receive in print, such of them as shal be thought fit to serve thee in due season, without any Disguises or Forgeries, unto which I do hereby give my attestation. Also my Husband left seventeen Books compleatly perfected, in the hands of the said Mr.* Cole, *for which he paid my Husband in his life-time: And Mr.* Cole *is ready and willing (on any good occasion) to shew any of the said seventy-nine Books, or the seventeen, to such as doubt thereof.*

And if any Person shal question the Truth of any part of this Vindication, or Epistle; if they wil take pains to come to me, I wil face to face, justifie the truth of every word thereof, as I have subscribed my Hand thereunto in the presence of many witnesses.

I profess in the presence of the great God, the searcher of al hearts, before whom Mr. Brooks *and I must one day give an account of al our Actions: That I have not published this Epistle or Vindication, out of any dis-respect to Mr.* Brooks (*for I much respect the man, and would be glad to serve him to my power*) *but only to cleer my Husband from the folly and weakness cast upon him by the means above expressed. And out of tenderness to Mr.* Brooks; *I first tried other means of keeping, and afterwards of repairing my Husbands Credit, and then stayed long to see if he would repair (in any measure) the wrong done to my Husband, and my self. I desire to be:*

Your Servant (in,
and for the Truth)
Alice Culpeper.

From my House, next door to the
Red Lyon in Spitale-fields,
October, 18. 1655.

Mris. *Culpeper* did the 18. of *October*, subscribe this Epistle in Vindication of her Husband's *Reputation*, before Ten Witnesses, as she had done another Epistle on the ninth of *October*, almost in the same words with this, except neer the Conclusion.

A TREATISE OF THE GOUT.

Chap. I. *Of the Nature of the Gout.*

THe Gout is by the Greeks called *Arthritis*, from *Arthron* signifying a Joynt; but by the Latines it is termed, *Morbus* or *Dolor Articularis*; and by us in Englisſh it hath its Name from the place affected, and in general is called the Gout. The more Barbarous among the Latin Phyſitians cal it *Guta*, becauſe that this Malady is excited by a flux, made as it were drop by drop. And there are likewiſe of the more Modern writers, who follow theſe; yea they prefer this Appellation before all other whatſoever; but yet not ſo rightly, as anon, in the firſt Queſtion, we ſhall ſhew you. *Its Name.*

But now, albeit that *Arthron* (as by the Author of the *Medicinal Definitions* and *Introduction* it is defined,) be the *Compages* and Compoſition of the Bones, ordained for the motion of the ſeveral parts; yet here notwithſtanding in this place, by the word *Articulus*, or joynts, we are not to underſtand the very *Compages* of the bones; and the *Syntheſis* or Union of them; or the Extremities of the Bones that are conjoyned; or the ſpace betwixt the Bones, which are Joyned together by the joynt: but the parts that Joyn the very Joynt together, and encompaſs it; eſpecially ſuch of the parts as are endued with ſenſe, to wit, the Membrans, Membranous Ligaments, the extremities of the Muſcles, and the Nerves that are inſerted in theſe parts. *Arthron what it is.*

But in regard that the Joynts are various, from the difference of theſe, and from the variety of the parts affected, the Gout (which the Greeks cal *Arthritis*) hath alſo received divers and different Names; and if the Feet be affected, it is called *Podagra*; if the Hands, *Chiragra*; if the Hip, *Iſchias*; if the Knee, *Gonagra*; and many other of theſe words, derived from the place affected, and the Greek word *Agra* which ſignifieth a taking or ſeizing upon; ſo that *Podagra* is nothing elſe but the taking of the Feet; and *Chiragra* the taking of the Hands; in regard that theſe members are in this Diſeaſe as it were taken, and by it enſnared, and held faſt: even as by *Lucian* (in his *Tragopodagra*) the Gout is brought in thus ſpeaking: *The differences of the gout, according to the variety of the Joynts.*

By the moſt of Men I am called Podagra, *being the taking, and deteining of the Feet.*

But in the other Joynts it hath no ſpecial name, but by a common and general name it is called *Arthritis*, that is, the Gout; like as alſo in general, it is then called *Arthritis*, when at one and the ſame time a pain ſeizeth upon many of the Joynts together. But the truth is, that ſome certain men there have been who have feigned & made very many ſuch like words as theſe; and among the reſt, *Ambroſe Parry*, (in his firſt Chapter of the Gout:) and if the Malady be in the Joynt of the Jaw they call it *Siagonagra*; if in the Neck, *Trachelagra*; if in the *Spina Dorſi* or Back-bone, *Rachiſagra*; if in the ſhoulder, *Omagra*; and if in the Joynt of the

Elbow, they term it *Pechyagra*. But we meet with no such Names as these in any of the Greek Authors; neither indeed are they commonly used; although that these Grecians themselves tel us very often that the *Arthritis* may be generated in many parts of the Body.

Mentagra what it is. And in *Pliny* also (in his 27. *B. Chap.* 1.) we meet with the word *Mentagra*, as first invented (as he saith) in sport, and merriment, (for it is a vitious medley Composition of a word, from a Latin and a Greek word, and such as the learned are never wont to make use of) but soon after notwithstanding it became common: but the truth is, that Affect belongs not to the *Arthritis* or Gout; but it was a certain foulness and nastiness of the face, and a kind of Scabbiness, perteining, and to be referred unto the *Lichenes*.

The Latines have likewise retained the Greek words, since that even from them they received the Disease also. Touching which *Pliny* in his B. 26. Chapter, 10. The *Podagra* (saith he) *Was wont to be a Disease more Rare, and not only a stranger unto the memories of our Fathers and Grand-Fathers, but even unto our own also. For had it been anciently known in* Italy, *it had ere this time received a Latin Name.*

And yet notwithstanding it is here to be observed, that although the word *Podagra* be properly taken for the pain of the Feet; Yet sometimes also (as even *Crato* in his 253 *Consil.* confesseth) by an appellation borrowed from one Member, the word *Podagra* is to be taken and understood for every kinde of Gout in what part soever; in regard that so it is wont to happen, that the Feet for the most part, in the first place, and more frequently are taken, and affected with this Disease; and they also are very seldom free, when the other Joynts are affected. And hence it is also, that *Lucian* inscribeth that *Dialogue* of his, which is touching the *Arthritis* or Gout in general, by the name of *Tragopodagra*. And so they that have written in praise of the Gout *Podagra* (as *Cardanus*, and others) they all of them seem to treat of *Arthritis* or the Gout in general. Yea and certain Physitians there are that treat properly of *Arthritis* or the Gout in General, and yet they inscribe these their Tracts, *de Podagra*, or of the Gout (in special) of the Feet.

What place the Gout most frequently invadeth. To wit, most frequently this pain invadeth the Feet; and indeed most of al, and in the first place, the great Toe of the Foot. For Nature (as much as she is able) is wont to drive forth the vitious Humors unto the extream and remote parts; and the Feet are likewise more remote from the Fountain of heat; and they are also more in motion, by which the Humors are drawn unto them. And from hence it is that *Galen* (in the sixth *Sect.* of the *Aphorisms*, *Aphorism.* 28.) writeth, that al those that are troubled with the Gout, that is to say, with the pains of all the Joynts, they are first of all taken with the Gout *Podagra*, or the Gout in the Joynts of the Feet. This indeed for the most part so happeneth, but yet not alwaies. For in some the Gout begins in their Hands; and some have it first in their Knee, and in some it beginneth in some other of the Joynts. And albeit that it first of al seize upon the Feet, yet notwithstanding it afterwards also for the most part invadeth the Joynts of the Fingers, or those places that are about the Hand Wrist, as also the Joynts of the Arm and Elbow, and sometimes likewise the Neck, and the Joynts of the Jaw-bone. And indeed this Evil in the first beginning of it (for the most part) seizeth upon but one of the Joynts, either in the Foot, (which most usually happeneth) or else where; but then afterwards, (the bowels being debilitated by the thick and often returns of the Disease, and the Native heat being much impaired, and the matter dayly more and more heaped up) it then invadeth more of the Joynts; so that it often cometh to that pass, that there is scarcely any Joynt or Juncture of the bones throughout the whole Body that may be said to be free from this Malady; and as *Lucian* (in his *Tragopodagra*) writeth, *This Evil tortureth and tormenteth the affiicted and Miserable Body, from the very Fingers ends, even unto the extream parts of the Feet, and the ends of the Toes.*

Yea, and oftentimes it comes to that, that the vitious Humor is not only poured out into all the Joynts, but likewise into other sensible parts; as it hath been often observed, that in some this Humor hath been so poured forth into the Teeth, that it hath there caused a pain; and in others (in whom it hath been poured forth unto the breast) it hath there excited a spurious and bastard Pleurisie.

But

But now this Malady is not wont to continue long at a time, but to afflict the party by certain intervals and Periods, whiles the matter heaped up is thrust forth unto the Joynts by certain intervals; which indeed in the beginning are somwhat longer; so that the Diseased persons are often free for six months, and somtimes likewise they are free from this Gout for a whole year together; but then afterwrads the Bowels and the Native heat being much weakned and impayred, and many vitious Humors being heaped up together, the Malady returneth by shorter intervals, somtimes after three months, and somtimes every month; Yea and some there are, whom it doth continually afflict and make them to keep their beds. *The period of the gout*

Now *Arthritis*, or the Gout, is in the general defined to be, *A pain of the parts about the Joynts, excited from the defluxion of a serous and sharp Humor, and poured forth into them out of the Veins and Arteries.* Or, if it please you rather to define it in any other manner, when a swelling doth now concur with it, you may then say that it is a *Tumor or Swelling about the Joynts, arising from a defluxion of the serous or wheyish, and sharp Humor by the Veins and Arteries unto the place affected; and by reason of the extension of the Membranes about the Joynts, and the Acrimony of the Humors Twinging and pulling them it hath Joyned with it a pain, and hinderance of motion.* *The definition of the Gout in general.*

And because that the Nature of this Disease is such, that when it hath once begun to infest and trouble a person, the Body can hardly ever be so carefully looked unto, and well ordered, but that upon every sleight cause and upon the least occasion given it will again return, and indeed by certain Periods, (somtimes once a year, somtimes every six Months, and now and then once every Month:) many therefore of the most learned Physitians do likewise add this in the definition, that it is a pain or swelling returning by certain intervals and Periods. But if there be any one that thinketh it therefore to be omitted, because that he who is at the first troubled with the Gout, and so hath not suffered many Paroxysms returning by intervals, yet may be truly said to be affected with the Gout: yet Notwithstanding, he cannot deny this, that the very Nature of the Disease is such that even in the very first Paroxysm the Disease is in it self naturally fit to return by intervals; like as he who is at first taken with a Tertian or Quartane Feaver, is truly said to be troubled with a Tertian or a Quartan, albeit that he hath not yet undergone many Paroxysms or fits returning every Third or Fourth day. *Whether it be proper to the gout to return by intervals.*

Franciscus India indeed blameth those that define the Gout by a pain, in regard that neglecting the Disease they define this Malady by its Symptoms. But it is no new thing, to define some certain Affects (in the which the Symptom and the Disease concur) by the Symptoms, as more urgent, more troublesom and grievous unto the Diseased party, and more manifest in themselves. And so the Phrensy is defined by a Deliry, and the Pleurisie by a pain; although that there be in both places present a Disease, to wit, an inflammation. And therefore there are many of the ablest Physitians, both Ancient and Modern, who inscribe their Tracts touching this Affect, *of the pain of the Joynts.* Neither again may the Gout be here alwaies so fitly defined by a Tumor or swelling, in regard that oftentimes there is no swelling evidently appearing in the External parts; and yet nevertheless the pain is then greater and more vehement then when there is a swelling in the part. But *India* himself is very much mistaken and greatly erreth, whiles he defineth this Malady by a defluxion.

And moreover, although that every Gout that happeneth about the Joynts may be called a pain (and in this manner this name may be also attributed unto pains that happen in disjoyntings, Contusions, or bruises and blows, wounds, that which is in the French Pox, that which happeneth unto Virgins while their Courses are flowing from them, or such as happen unto the Hips of great Bellyed Women that are neer the time of their Travail, or in general, unto all pains whatsoever that happen about the Joynts:) yet notwithstanding, we do not here take the word Gout in so large a sence, but in a more eminent and especial manner we here by this Name understand that peculiar kinde of pain which the Germans cal *Das Zipperlein*, arising from a sudden influx of a Humor into the Joynts, insinuating it self into the more hidden and inward parts of the Joynts, and returning by intervals and Periods. *Whether every pain of the joynts ought to be called the Gout?*

The

The subject of the Gout.

The subject of the Gout (if it be defined by pain) are only the Membranous parts, and those parts about the Joynts that are endued with a quick sense and feeling. For a Membrane being the Adequate subject of the Touch, even here also those parts that are grieved with pain do suffer it as they are membranous; from which nevertheless we may not exclude the Membranous Ligaments. For although that *Galen* teach us that all the Ligaments want sense, yet notwithstanding we are not to deny sense unto the Membranous Ligaments, which (as we finde by experience) are very sensible of pricking, and the Gout it self doth evidence it. Neither is that Reason they commonly alleadg to the Contrary of any great weight and moment, to wit, that a Man should be alwaies Obnoxious unto pains, and never free from exeruciating Tortures, if the Ligaments that are sensible of pain should dash and strike against the bones: for Nature hath so fenced and guarded those parts, and so admirably ordered it, that no such thing can happen. And hence it is that we daily lay hold on with our hands, and walk upon our Feet, in which there are very many Tendons, Nerves, and Membranes, and yet nevertheless we are not sensible of any pain. But if it be defined by a Tumor or swelling, then all the parts that joyn together the Joynt, and lie round about it, may be said to be the subject of the Gout. But now that these pains are excited more about the Joynts, then elsewhere, the Cause is this, to wit, that the Veins and Arteries pour forth in these places (in the which there is a Concourse of the Membranes and Nerves) those Sharp Humors which Nature endeavoreth to expel, and which cannot flow forth in the middle Channel of the said Veins and Arteries; and because that the Humors arriving at the seat of the Joynts stick fast in these more streight and narrow places, where all the parts that end there are joyned together, and infolded the one within the other; whereas elswhere they might more freely be moved up and down, and have room enough to dispersе themselves hither and thither.

Whether al the Ligaments want sense

And indeed, the truth is, that now and then that Humor is also diffused into other parts; and there is a certain Nameless Author, who (*in the eighth Section of his B. of the Gout, added unto the writings of the principal Physitians*) telleth us, that these kind of fluxions do not only infest the Hands, Feet, and all the joynts, but that it likewise maketh an impression upon the very Head, upon the very Liver, yea and sometimes upon the very Heart it self. And *Hieronymus Capivaccius* also (in his *Consil.* collected from *Scholtzius*, *Consil.* 226.) maketh mention of the Gout pain in the side; by reason of which the sick person was constrained to lie upon his Back, neither was he able to move his sides. And a person of Honor once told me (as I remember) that a certain man afflicted with the Gout, felt likewise very sore and grievous pains in his very Yard: and it was related unto me by an Honorable Lady, that a Kinswoman of hers being troubled with the Gout, a certain Marl (for so she called it, and indeed not unfitly) brake forth also in her Fore-Head, so that it might have been even swept off like sand, and grains of Salt. But the truth is, the Cause breeding the Gout, if it be in great abundance, it may likewise be diffused into other parts besides the joynts, but yet notwithstanding it doth not breed the Gout any where else but in the joynts.

Why those who are troubled with the Gout do seldom suffer any convulsion?

But now it may here in this place (and that not without good cause) be demanded how it comes to pass that those persons that are afflicted with the Gout do yet so seldom suffer any Convulsion (but only a pain) whenas yet the Nervous parts are here affected, and indeed so twinged and pulled by the sharp Humor that there may seem to be great cause for the exciting of a Convulsion? *Thomas Erastus*, in his 4. *Disputat.* against *Paracelsus*, thinks this to be the Cause, that the Humor that is poured forth about the Nerves is wateriſh and Flegmatick, and therefore doth more loosen then extend them: and if this be not the Cause, he confesseth ingeniously that he is altogether ignorant of it, and knoweth not what it is. But yet we do not acknowledg this for the only true Cause; neither is it indeed a truth that the Humor exciting the Gout is simply wateriſh and Flegmatick, that rather looseneth then extendeth the parts, as we shall hereafter prove, and as it appeareth even by the pain it self, which is most sharp and intollerable. And therefore I conceive the cause hereof to be in the place affected, to wit, that not the very Nerves themselves (as they are inserted into the parts destined unto motion, *viz.* The Muscles that serve thereunto) are affected, but rather the Membranes, and the Membranous Ligaments, which parts are not ordained for motion, neither serve they thereunto;

The opinion of Erastus.

and

and therefore although they suffer most grievous pains, yet nevertheless they excite no Convulsive motion, unless haply the Brain be drawn into consent; like as we may plainly see the truth of this in the pains of the Teeth, the Eyes, the *Pleura* Membrane, the *Colon* Intestine, and the like pains; in all which it is not the Nerves (appointed for motion) but rather the Membranes that are affected, without any kind of Convulsion. And the very same happeneth in the Gout, in which the membranous parts that are about the Joynts, and knit together the extremities of the Joynts, are either distended, or twinged and pulled by the Humors flowing thereunto.

There are some indeed who assert, that the very Cavity or hollow space that is between the extremities of the Bones do receive the Humors that flow thereunto, and that this space is the true subject of the Cause breeding the Gout. But this is false, as anon we shall shew you in the *Third Question*.

The *Proxime* or next Cause of the Gout pain (as in other parts likewise) is the solution of Continuity, which is produced by the afflux of the sharp Humors into the Membranous parts about the Joynts either by distending them, or else by their acrimony at once both pricking and pulling them.

Now those things that accompany this pain, are First, an impotency and weakness of the motion; and by the motion of the joynt the pain is irritated and augmented. And then also a swelling (and this for the most part with a redness and heat) followeth upon it, and is discerned more especially in the extream joynts; and yet nevertheless, there appeareth now and then only a moist and waterish swelling without any redness at al. In the Hip and Shoulder blade (being fleshy places) there scarcely appeareth any swelling at all externally, but the Humor that hath flown thereunto lieth hid and covered by the flesh. And there is also a Feaver (a continued one) that almost alwaies with a pain invadeth in the *Arthritis*, or Gout in general, and oftentimes also in the Gout of the Feet and Knees; and the sick person is first of all taken with an extream Chilness, and then presently a heat followeth upon it; and this is the Cause that the sick persons are so vexed and troubled with thirst, and that the pulse is changed, and that the Urines become very red, which oftentimes at the first beginning are waterish. But now what kinde of Feaver this is that accompanieth the Gout, in this many Authors differ, as below, in the *fourth Question*, we shall shew you. And sometimes there are likewise other Symptoms that follow upon the said pain; and among the rest, watchings, restlessness, and a *Spasm*. *Symptoms of the gout*

If the Gout continue long, and often afflict the sick party, then at the length there are generated in the joynts hard knots and knobs, from the more thick part of the serous or wheyish Humor, that even of its own accord tendeth to a Coagulation or Clotting together; and if the Skin be opened, out there runneth a matter, sometimes fluid and white, and sometimes like unto Playster or white Lime; and sometimes the matter is hard, like unto gravelly stones that may be crumbled.

This Malady is likewise known to disperse it self among the common People, the Cause being Generated from the general and common fault and vice either of the Air, or of the ordinary diet in many places. But now, whether it may at any time happen by Reason of any defect of that kind of fruit we call Mulberries, we shall further discuss this point anon, in the *fift Question*.

Chap. 2. *Of the Causes of the Gout.*

THe *Proxime* or nigheſt Cauſe of this pain in the Gout, is the Solution of Unity in the Membranous parts about the joynts: Now this solution proceedeth not (as *Capivaccius* wil have it) only from a Compression of the sensible parts about the joynt, caused by a preternatural repletion of the Ligaments with a Humor flowing thereto. For why, the Ligaments are most solid, and most thick, in so much that (in the first place) they themselves cannot admit of the Humors; and the pain is oftentimes in the highest degree, (when there is scarcely any swelling appearing,) and indeed far greater then that it should possibly be caused by compression only. This pain is therefore rather caused by the distention, and twinging, or pricking, in the sensible and tender parts about the Joynt. *The cause of the gout. Solution of unity in the Gout from whence it happeneth.*

But now, what the Cauſe of this diſtention, Pulling, and Pricking, is, cannot eaſily be explained, by reaſon of the difference in Opinions (among Phyſitians,) touching the ſame. For ſome there are that teach us how that the Gout is generated only from a diſtemper; others from a Winde; a third ſort, only from a Humor; and ſome of theſe will have this Humor to be flegm, others Choler, others Flegm with Choler; others aſſert it to be Flegm mingled with blood; others, Crude and Watery blood; others ſay that it is a whey; and others there are that admit of all theſe Humors. And indeed ſome affirm that this Humor floweth down from the Head, others again from the internal parts; others from the external parts between the Skul and the Skin; ſome again wil have it to flow forth of the Veins, and others by both theſe waies; touching which we intend to diſcourſe more at large, below, in the *ſeventh Queſtion*.

The neereſt cauſes of the gout

But in brief, that we may here in a word ſtate the Controverſie, the immediate and neereſt Cauſe of the Gout is a Humor, partly diſtending the parts of a quick ſenſe about the joynt, and partly pricking and lancing them, to wit, the ſerous or wheyiſh Humor, and yet ſuch as is not wateriſh, but Salt and ſharp, and (as the Chymiſts call it) Tartarous; bred in the ſanguification, in the Liver, and in the Spleen, and by Nature thruſt forth by the Veins and Arteries into the parts about the joynt. And indeed this Humor is altogether of a peculiar Nature, and much different from thoſe other Humors that breed an inflammation in other parts; and it hath its original from the ſame kind of Aliment that Plants draw from the Earth. For in all ſorts of Earth there is ſomthing that is ſaltiſh, and partaking of a Mineral Nature. Which whether we call it the Salt of the Earth, or elſe Tartar (with the common ſort of Chymiſts) it matters not with me, ſo that we agree in the thing it ſelf.

Whether the Salt of the Earth and Tartar differ.

And yet notwithſtanding it ſeems not al one to me, whether we call it the Salt of the Earth, or elſe Tartar. For Salt is indeed a ſimple Body of its own kind; but Tartar (as it is in truth taken here generally in this place by the Chymiſts) is a compound of Salt, and Earth, yea and of Sulphur likewiſe. From whence alſo it is that there are conſtituted Differences of ſuch like Earths; and ſo there ariſeth a diverſity of the Humor breeding the Gout in divers Bodies and places. And from either the abundance or ſcarcity of this Salt, and the mixture of it with other Juyces there ariſe various differences of Earths; ſo that ſome of them are dirty, others muddy, a third ſort Clayiſh, a fourth ſandy and Crumbling, a fifth Limye; and in ſome Earths there is an abundance of that we call Marle, in others Chalk, and in others there is ſomthing elſe that aboundeth: and in ſome Earths (in the which likewiſe Bread Corn grows very plentifully) there is ſo great a ſtore of this Salt, that even out of them there may be deſtilled a certain ſpirit that diſſolveth Metals. That Salt or Tartar is attracted from Plants (together with their Aliment) out of the Earth; and hence it is derived into men unto whom thoſe Plants ſerve for Meat and Drink: and unleſs it be ſevered and ſeparated in a Convenient manner, it is at length mingled together with the blood, and being altogether unfit for the nouriſhing of the Body it is in the end driven down and thruſt into the joynts, for thoſe Cauſes that we ſhal anon declare unto you. And this Salt Humor that cauſeth the Gout oftentimes cometh very neer unto the Nature of ſpirits (as the Chymiſts call them) ſuch as are thoſe of Wine, and other Vegetables, endued with a volatile Salt; as alſo of *Salt*, Vitriol, Nitre, and *Aqua Fortis*; which although that they are thin, Subtile, and Reſemble the Nature of Water, yet notwithſtanding they contain in them a moſt ſharp and biting Salt. And this Salt is contained as well in the Arteries, as in the Veins; from whence likewiſe it is, that being moſt ſubtile it exciteth very extream, intollerable, and moſt acute pains. For it is not requiſite, that thoſe Humors ſhould alwaies hurt the Body in a thick and groſs manner; but oftentimes they are made ſpiritual, as we ſhal afterwards alſo (in the Cauſes) ſhew you, touching Wine. And many things there are that teach us the truth of this. Firſt of all the very vehemency and fiercenſs of the pain it ſelf, which cannot poſſibly proceed from a Flegmatick or watry Humor, or elſe from Blood diſtending the parts; but from a very ſharp Humor, being oftentimes indeed but little in its quantity and bulk, but yet in power very great, and moſt efficacious. And moreover it appeareth from this, that at length there are generated in the Joynts certain hard knobs and knots; out of which there is taken, and goeth forth

forth a matter like unto Lime, such as also some certain Wines before they be wrackt and taken off their Lees do yield forth; which happeneth not at all in other Tumors, which are rather turned into *Pus*, then any such mattter as this; and therefore it sufficiently sheweth that the Gout hath some other peculiar cause, that the rest of the Tumors or swellings have not. And Thirdly, the Causes do argue and prove the same; since that there is nothing that maketh more for the generation of the Gout then Wine, which most of all aboundeth with such a Salt and Tartar as we mentioned before; there being no plant (as we shall also further shew you below) that doth more attract that that is Salt, Clayie, and Limye, in the Earth, then the Vine it self; although indeed other Plants likewise, (as Wheat and Barley) do draw unto them the very same matter as the Vine doth, but in nothing neer so great an abundance. Yea, and this matter is somtimes likewise conteined in the Water; and from hence it is, that now and then such as are Abstemious, or that otherwise by reason of their poverty they drink no Wine, but Water, are yet troubled with the Gout; and in some places we find that even Beer is exceeding hurtful unto those that are subject unto the Gout, whether this happen by Reason of the Corn there growing (of which they make their Beer) or from the Water they use for the same purpose.

And from hence it cometh to pass, that the Gout in very many places is a Disease almost Epidemical. And in those very places where the Gout is in a manner Epidemical (as it is in many places of *Moravia*) the inhabitants there, besides the Gout, are troubled likewise with the Stone, Colick, and that which ariseth from thence, the Palsie and contraction of the Members, and likewise the Falling-sickness; which affects (all or most of them) proceed not from the Watery Humor, but also from that which is sharp and Salt. And last of all, even this teacheth us that this Humor is serous or wheyish, that the Gout can by no means be drawn to a suppuration. For the blood is easily turned into *Pus*, and so are likewise the other Humors; but as for the serous and Salt Humors, this is the Nature of them, that if they be altogether thin, they are then wholly resolved; or if they have any thing that is Tartarous and thick mingled with them, they are then converted into hard knots, and smal Stones that are brittle and crumbling.

This matter, in regard that it cometh neerer unto the Nature of Minerals then of vegetables, it cannot therefore by any means afford a good and fit Aliment unto the Body; and so it ought either immediatly in the First, or else in the Second Concoction to be expelled; which when it happeneth, the Gout is not then generated. And from hence it is, that many Wine-bibbers, and Gluttons, are free from the Gout; which therefore happeneth, because that they have those their Bowels that are destined for Concoction very strong and vigorous; so that they do exactly separate all whatsoever is Excrementitious in those Meats and Drinks that they take in, and evacuate them by convenient waies. But if this matter be not forthwith evacuated, but be reteined stil in the Body, it is then thrust forward hither and thither in the Body, until it be at the length driven unto the Joynts.

Whether Choller, Flegm, or Melancholy, &c. be the cause of the gout.

And therefore without cause or ground it is (as anon in the 5. *Question* we shall more at large shew you) that by some Choler, Flegm, Melancholly, and Blood, are here accused. For possibly it may be that in one Body this Humor may abound and in another that Humor may be in great abundance, and may together flow unto the pained Joynt: yet nevertheless, that wheyish Humor (which Nature desireth to expel forth and therefore thrusts it forward unto the Joynts) is the first Cause of the motion; and then afterwards the pain likewise stirs up and causeth other humors to flow unto the place affected: and therefore if the Body be Plethorical, the blood; but if Cacochymical, then other Humors also are moved unto the place affected. Mean while, those very Humors are not the prime cause of the Gout; and if they had been altogether without that salt and serous Humor, it had never flown unto the joynts, since that there are many that are Plethorick and Cacochymick, who yet notwithstanding are not troubled with the Gout. And therefore what *Mercatus* writeth, is a truth, to wit, that although juyces or Humors may much abound in the Body, and become very vitious, they do not for this presently degenerate into the Articular affects, and produce the Gout: but that Humor which ought to produce the Gout (as we have already said) is

ferous, Salt, Sharp, and Tartarous; and hath a peculiar tendency unto the joynts.

what required unto every fluxion.

And now, whereas unto every fluxion there is required the matter flowing, the Term from which, and the place whitherto it tendeth, and the way by which; and that we have now already spoken unto the matter, the cause of the Gout; it remaineth that we proceed to speak of the Term from whence, (or the place in which the matter is generated) the way by which it floweth, and the term unto which it tendeth, or the part receiving.

The part receiving the fluxion in the gout

The weakness of the joynts how it concurreth unto the Gout.

And that we may first of all Treat of the part receiving, (that so we may afterwards Joyntly explain the Causes both internal and external: in the first place, the parts recipient are here the Joynts, (and those of the Feet especially, from which the Gout *Podagra* hath its original) as weaker then all the rest of the parts, in regard that they are endued with a weaker heat, consisting (as they do) of bones, ligaments, Cartilages, Tendons, Nerves and Membrans; and are further distant from the Fountain of heat; and are likewise greatly exposed unto the injuries of External Causes; and are also much weakned by labor and frequent exercises, and hereupon are rendered most apt and ready to receive the Humors that flow thereunto. And yet notwithstanding the alone imbecillity of the joynts is not sufficient for the generating of the Gout, but there is likewise altogether necessary the fluxion it self.

For (as *Galen* hath it in his *Sixth B. of the preservation of Health Chap.* 13.) they who Collect and Treasure up nothing within them that is superfluous, in them these weak and infirm parts remain still in safety. Of which this is one most evident Argument, that some have for many Months together been very weak and infirm in divers parts of their Body, without any such pain as the Gout bringeth along with it; whereas if weakness alone would cause it, the infirm part should perpetually be troubled, there being no Cessation at all of the Cause of its weakness and infirmity. And now therefore, because that it is not perpetually afflicted, (the Cause of its imbecillity being still continued) we may conclude, as a thing most manifest, that there is something else intervening, which is the Cause of the breeding of this affect; and this most certainly is nothing else, but that that is redundant either in quality or quantity. And yet notwithstanding, that the imbecillity of the parts is the necessary cause of the generating of the Gout, (as the most of the ablest Physitians do assert and determine) is denied by *Carolus Piso* (in his *B. touching Diseases from the affluence of the serous Humor, Consil.* 1. *of the Gout*) whilest he writeth, that Physitians oftentimes trouble themselves to no purpose, when they admonish us, that there is a very special regard to be had unto the weakness of the recipient parts, seeing that the Joynts do more easily and readily of their own accord receive and admit the hot Wheyish Humor, then the rest of the Members; this doth not (saith he) proceed from their imbecillity, or from any distemper, that is, loosness, or rarity, but from the very Conformation it self, and this not placed in the Cavity, but rather in the Conjunction with the ends of all the Vessels; which Conformation to alter and change is not at all within our power. And he hath there asserted, that the Joynts for this Reason only admit of and drink in the hot Wheyish Humor, because that in them are terminated the external branches of the internal Vessels. To wit, that the Ebullition or boyling out of this serous Humor doth first of all begin in the greater and the internal Vessels, and that from hence it falleth forth into the lesser, and at length into the extream branches, which having no other place whither they they may pour back the Humor they have received in, it is thereupon stopt and heaped up together in the joynts, in which the external Vessels (almost al of them) are terminated. All which although it may seem very agreeable unto the truth, yet notwithstanding two things there are that must here be taken notice of. The former is this, that although it be true, that those greater Trunks of the hollow Vein, and the Arteries, (their branches being dispersed hither and thither) are for the greatest part of them terminated in the joynts: yet Nevertheless there are likewise many of those branches which here and there are Terminated in the Flesh, and other parts, and yet for all that they Transfuse not the matter of the Gout into those parts. And moreover also the matter of the Gout is not alwaies poured forth

even

even unto the extream Joynts, but that it oftentimes alſo ſtops and ſtaies in the mid-way, in the Hip, Knees, and Elbows. The other thing to be taken notice of, is this, that albeit that Conformation of the Veſſels (by reaſon of which they are terminated into the Joynts) cannot be changed; yet notwithſtanding the Laxity and weakneſs of the parts into which they are ingrafted may in ſome meaſure be changed by thoſe medicaments that corroborate, although it be the leaſt part of the Cure (as hath been ſaid) that is to be expected from theſe.

why the humor that is the cauſe of the gout is moved unto the Joynts rather than to the other parts.

But beſides the imbecillity of the Joynts, there is yet ſomething elſe that ſeemeth to me to be the Cauſe why this humor is moved unto the Joynts rather than to any other parts; which conceit of mine I ſubmit (as a Paradox only) and leave it unto the free judgment of the Judicious and Candid Reader; and it is this. It is moſt certain, that the Blood in our Bodies is not altogether homogeneous, but obtaineth divers parts, and that divers parts of the Body are nouriſhed by thoſe different parts of the Blood; as the Fleſh by the more temperate, the Bones by the thicker, the Lungs by the more ſubtile, and ſo likewiſe the reſt of the parts attract unto themſelves from the blood a fit and convenient Nutriment. And this ſeemeth alſo to be proved by the ſtone called *Oſteocolla* (ſo called becauſe that it hath in it a notable virtue of Conglutinating the broken Bones) which being taken inwardly penetrateth into the Bones, rather than into any other parts, and cauſeth that the *Calli* are generated in a very ſhort time; yea, in thoſe that are yong it produceth an overgreat *Callus*; as we may ſee in *Guilhelm. Fabricius* his firſt Century, *Obſervat.* 90. & 91. Neither are theſe things done in a ſound Body only; but even the vitious humors likewiſe have not an inclination al of them, neither are they al driven unto any one part; but ſome of them tend unto one part, and others of them unto other parts; and this we are taught, as by other diſeaſes, ſo more eſpecially by the *Plica Polonica* above mentioned. And therefore ſeeing that *Herculeſ Saxonia* in his Book of the *Plica*, Chap. 26. writeth nothing but the truth, when he ſaith that the humor (the Cauſe of the *Plica*) hath a propriety not wel agreeing with the Joynts, Ligaments, Tendons, Nerves, and al the Membranes; but a certain familiarity with the Hairs and the extream part of the skin: I conceive that I may alſo as rightly Aſſert that the Humor the Cauſe of the Gout hath a certain kind of familiarity and natural alliance with the Bones; but that it is an Enemy unto the Membranous parts, if not in an occult manner, yet certainly by its Acrimony, and by its twinging and lancing faculty. For very probable it is, ſeeing that the Bones as alſo the Ligaments and tendons, are nouriſhed by a Blood that is more Earthy, as having an alliance with the Tartarous humor; that other Tartarous humors alſo (as wel the thick, as the ſubtile) are thruſt forth more unto the Joynts than unto any other parts; and more eſpecially unto the Joynts of extream parts, ſince that Nature (as much as poſſibly ſhe can) is wont to thruſt forth the vitious humors from the principal places unto the moſt remore parts. For although it be ſo ſomtimes that Nature doth not preſently thruſt forth into the extream Joynts of the Feet or the Hands the matter that is the Cauſe of the Gout, but that it ſtops and ſtaies in the mid'ſt of ſome Joynt; yet notwithſtanding afterwards when the pains begin Nature (if ſhe be yet any thing ſtrong) driveth back again into the greater Veins the Matter by the ſame waies by which it flowed in; and from hence ſhe thruſts it forward even unto the extream Joynts: touching which, as alſo whether there lie any thing hid in the very Bones themſelves that may make for the exciting of the Arthritick Paroxyſm, we ſhal ſpeak more hereafter in the eighth Queſtion.

whether the Gout be generated by a collection of the humors.

Secondly, As touching theſe humors (that are the Cauſe of the Gout) where they are Generated, and by what waies they paſs into the Joynts, the Opinions of Phyſitians are various and different; of which we ſhal ſpeak further in the ſeventh Queſtion. But now that I may in few words comprize the ſum and ſubſtance of the thing in queſtion; ſeeing that al ſwellings, and the preternatural Collection of humors in any part, is done two waies; to wit, either by Congeſtion by which the humor is by little and little collected and heaped up in the part, or elſe by Afflux; we cannot conceive that the former of theſe waies hath any place in the Gout. For if by Congeſtion and the alone weakneſs of the parts the humor ſhould be collected in the Joynts, then the pain and ſwelling could not be bred ſo ſuddenly, ſo eaſily, and ſo evidently; and the infirm part ſhould perpetually labor and ſuffer, in regard that the Cauſe of this diſtemper and pain ſhould never be abſent from it. But now, ſince that Perſons that have the Gout are not in a continual ſuffering condition, but that ſome of them are free for ſix months together, and that afterward the matter again floweth unto the Joynts, and that indeed ſuddenly, to wit, when there is a vitious humor collected in the Body, which urgeth and provoketh Nature unto the expulſion thereof: it eaſily from hence

appeareth

appeareth that the Gout is not generated by the collection of humors, that is not done but by degrees, now a little, and then a little. And therefore the most learned *Solenander* writeth truly in his *fourth Sect. Consil.* 24 *The humor* (saith he) *which is by little and little collected by the vice and fault of the particle of Nouriſhing, if at any time it could excite pain, and hinder the Motion, yet notwithſtanding there was never yet any Phyſitian that ever told us that it could excite the Diſeaſe we call the Gout.* But this notwithſtanding in the mean time I deny not, that in thoſe who are ſcarcely ever wel in their Feet or other Joynts, the imbecillity and weakneſs of the Joynts may poſſibly conduce very much unto the long laſting and continuation of the Malady. For the part that is infirm and weak doth not rightly aſſimilate the Aliment unto it ſelf, but collecteth the excrements, and thereupon it likewiſe the more eaſily receiveth the humors flowing unto it, and the more difficultly ſcattereth them when they are gotten together.

The long continuance of the Gout from whence it is.

Felix Platerus indeed maketh mention of a certain peculiar kind of Gout; ſuch almoſt as we ſhal likewiſe make mention of a little below (in the *Sixth Queſtion*) out of *Eraſtus*; which is excited, not by the matter that floweth from elſewhere, but from the excrement that is heaped up together from the Blood about the Region of the Joynts, the place affected being extreamly weakned from the many fluxions, and there heaping together new excrements, and cauſing a pain that is not very grievous or intollerable, which produceth a moiſt and watry kind of ſwelling rather than any other; and he aſſerts it for a moſt certain truth, that thoſe who are thus affected are very ſeldom or never free from the Gout; and ſomtimes by reaſon of the affluence of the humor, and ſomtimes again by the congeſtion and heaping of it up; from the one or the other of theſe Cauſes they alwaies carry about with them certain ſigns and tokens of the ſame, and are continually ſuffering ſomthing or other by reaſon of it.

Peculiar kinds of the Gout.

But the truth is, this is no peculiar kind of the Gout; and if ſo be that it differ from the Gout which we have deſcribed, it is not then the Gout, but rather a moiſt and watry ſwelling in the Feet. And hence it is that *Platerus* himſelf confeſſeth that it very ſeldom or never firſt beginneth of it ſelf, but that it is wont to follow ſome other that was cauſed from afluxion. To wit, by pain, and the long continued and frequent afflux of the humors the Joynts are ſo weakned, that they cannot rightly concoct the Aliment that floweth unto them; much leſs aſſimilate the ſame unto themſelves; and hence it is that there are many Excrements collected; and theſe being heaped up do excite that moiſt and watry ſwelling without any grievous pain: which ſwelling notwithſtanding (if the pain proper unto the Gout be not preſent with it) is not properly the Gout. But if the true *Arthritis* or Gout be joyned together with it, the debilitated part cannot then without much difficulty, and long time, diſcuſs and ſcatter the humor that hath flown unto it; and hereupon it hapenneth that before one humor be diſperſed (which as *Hippocrates* writeth, is ſeldom or never before the fortieth day) another humor floweth unto it, and to the ſick Perſon may ſeem continually as it were to be afflicted with the Gout; or likewiſe, if the Afflux be but by ſhort intervals, he is in very deed perpetually troubled therewith.

But now, in what manner, and from whence this afflux proceedeth, here likewiſe Authors ſeem to differ much among themſelves. But if waving and laying aſide Authority, we heedfully attend and obſerve the thing it ſelf, and thoſe things that are done about the ſick perſon, we ſhal eaſily perceive that this Afflux is by the Veins and Arteries. For in ſuch as are troubled with the Gout (upon the very firſt approach of the Paroxyſm) the Veſſels that tend unto the Hands and the Feet, and are inſerted into the extream Joynts, are wont manifeſtly to ſwel. And then again, this Diſeaſe doth ſuddenly invade, and the afflux is wont to be very ſudden, which cannot happen but only by the Veins and Arteries. And moreover, it eaſily paſſeth out of one place into another, eſpecially if cooling and repelling Medicaments be applied unto the part affected; and that pain that but even now afflicted the Foot, this Foot is no ſooner freed therefrom, but it preſently beginneth to afflict the other Foot, or the hand. Or, if Nature lie under the burden, and be not able to expel thoſe vitious Humors (theſe ſticking faſt about the Bowels, and eſpecially about the Heart) there are then excited ſtreightnings of the Heart, and faintings, with ſwounding fits (as I have oftentimes obſerved) which ceaſe not until that the vitious Humor be again driven out into another Joynt: which motion of the humor cannot be but by the common Veſſels. And furthermore, Feavers (as wel continual as intermitting) are ſomtimes terminated into the Gout; which could not be, unleſs the matter were in the Veins. And laſtly, a Feaver is wont to happen, and a change in the Pulſe, which ſheweth that the Humor is contained in the Veins and Arteries.

From whence the Afflux proceedeth.

How and from whence the Afflux is in the Gout.

And

And therefore ſeeing that this Humor (the cauſe of the Gout) is contained within the Veins and Arteries, and out of them poured forth into the Joynts; without doubt it muſt of neceſſity be generated in ſome Concoction of the Blood, and indeed ſuch a Concoction as out of which the Veins and Arteries receive that Humor which they contain: and this we determine to be in the Liver and Spleen, the Sanguification being there hurt in its own manner. *where the Humor, the cauſe of the gout, is generated.*

But now, the Cauſes (by reaſon of which this humor is generated) are two: The former whereof is ſomthing amiſs in the Liver and Spleen, and more eſpecially the exceſſive heat and drineſs of thoſe parts; and then the other cauſe thereof (this being indeed the chief and principal) is ſuch a kind of Aliment from Meats and Drink as maketh a continual ſupply of ſuch a like Tartarous matter. *For what cauſes it is generated.*

As for the firſt of theſe, The Stomach may indeed likewiſe confer ſomwhat hereunto, if in it the Chyle be not rightly elaborated; and if that after this Concoction the Tartarous feces or dregs be not moſt of them inſtantly ſeparated: and hence it is alſo that al Phyſitians warn us in the preventing of the Gout, to have a ſpecial regard unto the firſt Concoction: and yet notwithſtanding that hurt Concoction of the ſtomach doth not moſt immediately conduce unto the generating of the Gout, but that there is a neceſſity that the Concoction in the Liver and Spleen ſhould likewiſe be hurt. For if there be any thing amiſs in theſe (which cannot indeed very eaſily and determinately be demonſtrated and made to appear) it then cometh to paſs that the unuſeful parts, ſalt and tartarous (which are in the Chyle) cannot be rightly ſeparated, but remain mingled with the blood, and together with it are derived unto the Veins. And by reaſon of this Vice and fault of theſe Bowels it happeneth that oftentimes from Meats and Drinks in themſelves not very hurtful ſome perſons are very eaſily offended; and on the contrary, others that have ſtrong Bowels (in whom the Concoction of the blood, and the ſeparation of the excrements is rightly performed) although they uſually feed upon meats apt to breed the Gout, and fil themſelves alſo with Wine (and that likewiſe none of the wholſomeſt) they are not yet for al this at al troubled with the Gout.

But what this diſtemper of the Liver and Spleen is, cannot ſo eaſily be explained and unfolded. And yet nevertheleſs, if any one ſhal determine it to be a hot and dry diſtemper, I ſhal not at al gain-ſay him. But in what manner this hot and dry diſtemper doth effect what hath been ſaid, this is not ſo cleer. *Franciſcus Valleſius* tels us for a truth, That by this diſtemper there is ſtrongly preſſed forth a water from the reſt of the Juyces; which is not probable, unleſs it be fitly explained. For this we willingly grant, That if the Liver be more hot and dry than what naturally it ſhould be, inſtead then of a moderate Elixation or boyling there wil be a certain Aſſation or roſting; and ſo the blood that is generated muſt needs be ſharp. Others affirm (and indeed not unfitly) that the Liver and Spleen when they are vehemently and intemperately hot, attract the ſerous and ſalt Juyce in the Food, which ought to have been ſeparated and evacuated in the firſt Concoction, and ſo it comes to be mingled together with the blood. Yea, and haply alſo in the diſtempered Liver it ſelf and Spleen the Blood is not wel elaborated; and ſomthing there is left remaining therein that ought by right to have been ſeparated, which being afterwards heaped up in the Veins is the cauſe of the Gout. *what kind of diſtemper it is that maketh for the gout.*

And I am of Opinion that the very ſame happeneth in the Liver and Spleen, that happeneth in the Reins. For many there are that eat Cheeſe and other meats that are very apt to breed the Stone, and yet notwithſtanding they do not generate the ſame; whereas others on the contrary, in whoſe Reins there is a ſandy, gravelly, and ſtony conſtitution (as *Fernelius* calleth it) or a power in the Reins of breeding the ſtone, theſe are eaſily offended by the meats aforeſaid. And I conceive that the caſe is the ſame in the Gout; and that there is a certain vitious conſtitution in the Bowels of thoſe that are troubled with the Gout; and I am of Opinion that this vitious Conſtitution is the efficient cauſe of that Salt, or Tartar, by reaſon of which that Humor which is the cauſe of the Gout is produced, which when it once cometh to abound, it is then afterwards thruſt forth unto the Joynts. And this vitious conſtitution is communicated unto ſome from their Parents; and by others it is contracted from the uſe of Meat and Drink of a like Nature, and likewiſe from the Errors they commit in the whol courſe of their Dyet.

And moreover, Although the faculty of the Bowels be wel conſtituted; yet if the Meat and Drink abound with ſuch a like Tartarous matter, it cannot al of it be evacuated by Nature, in regard that neither in the firſt Concoction, nor yet in the ſecond, it cannot be ſeparated as it ought to be, but remains ſtil mingled with the Blood. But yet in the mean time

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(as much as may be) it is altered by Nature, and by her spiritualized also (if I may so speak) or as *Mercatus* speaketh, it is attenuated, poured abroad, and changed into a thin, spiritful, and sharp humor, which is afterwards by Nature thrust unto the Joynts. For the Joynts (as I said before) are parts that are weak, and extream, bony, and bloodless, unto which Nature is wont to thrust not only the serous Humors, but whatsoever likewise hath any alliance at al with the Humor that floweth. But now the imbecility of the Joynts is either Native or acquired. It may then be said to be Native, when either the Joynts themselves in their first structure are more loose, softer, and more apt to receive the Humors flowing unto them; or else when they have either from the Parents, or from the Grand Parents thus affected, by a right of Inheritance (as it were) contracted this distemper and weakness. But it may then be said to be acquired, when the Joynts are weakned either by overmuch labor, excess and injuries of the Air, or other Causes altering the Joynts.

The weakness of the Joynts twofold.

Why the Humor is moved to the joynts.

But now, that the Humor which is heaped up in the Veins, and about the Bowels, should be moved unto the Joynts, this cometh to pass, Because that Nature being stirred up and forced by the abundance of vitious humors, attempteth the expulsion of them. And yet if any thing happen that may move the humors, the Paroxysm is then more easily excited. And this cometh to pass if any one be provoked to wrath, or stricken with terror, or any other vehement affect of the mind, or if any shal be very hot, and then suddenly cool again on one and the same day, or else shal exercise himself immoderately, or make use of the Bath unseasonably. And this is likewise done by the retention of the usual and accustomed sweat, or the excess in qualities of the Ambient Air, and the change thereof; and more especially that change that is made at certain times of the Year: and it is manifest by Experience, that about the beginning of the Spring, and Autumn, the Blood is moved and stirred up and down in the Body; and if there be any thing faulty in it, Nature is wont to expel it unto the more ignoble parts; from whence arise scabbiness, the *Erysipelas*, Feavers, Gouts, and many other Diseases, according to the various disposition of bodies.

The Antecedent causes.

From al which it is easie to find out the Antecedent, Procatarctick, and altogether remote Causes, as also the external and internal Causes; which (of what kind soever they be) either they make for the generating of the matter and humor producing the Gout; or else they weaken the joynts; or else lastly, they so cause it that the humors are moved and excited.

But since that these are various, and that some of them do concur more waies for the generating of the Gout than others, they may therefore be considered according to those things we cal Things not Natural.

Air.

And first of al, As for the Air, We have already said that in the Spring time the Gout is most chiefly excited; and then again in the Autumn, by reason of the motion and change of the Humors that happeneth at that time. And the truth is, the Gout is wont in the Spring time most especially to infest the party, because that the humors that have been al the Winter long heaping up, are wont then to be poured abroad, and moved up and down, as *Lucian* telleth us in most elegant Verses making a description thereof, in his *Tragopodagra*.

And the very same may likewise be sometimes effected by other distempers of the Air: and like as the moist Constitution of the Air doth otherwise produce Catarrhs and Fluxes; so it likewise oftentimes causeth the Gout. And without doubt that Epidemical Gout (of which out of *Athenæus* we shal anon in the fist Question make mention) was at first produced by some peculiar Constitution of the Air.

And moreover, the Course of Dyet that is observed doth make very much for the generating of the Gout; and especially the drinking of strong Wines, by which alone many have attracted the Gout unto themselves; as *Quintus Serenus* writeth of *Ennius*.

And indeed there is no one thing that is more offensive and hurtful unto persons that are troubled with the Gout than the drinking of Wine, as we find it to be true by common experience. For there is nothing that obtaineth more of that Tartarous matter (or call it what you please) that is so apt and fit to generate the Gout than Wine.

Which matter although (as we said a little before) it may in some stronger bodies be separated; yet nevertheless, those that find themselves subject to the Gout, having but weak and infirm bowels, have no reason (after the example of other insatiable Wine-drinkers) to indulge themselves any liberty in the drinking of Wine; but it is far more fit for them to abstain from it. And so on the contrary, many have been freed from the Gout by their abstaining from Wine. And *Trincavel* (in his twelfth Book, and second Chapter, of the way of Curing the several parts of Mans Body) writeth that he knew a very aged Physitian at *Venice*, who having been exceedingly troubled with the Gout al his life long, even unto his old

The gout cured by abstinence from Wine.

Age,

Age, at length by abstaining from Wine for five yeers only, he came to be so freed from all those troublesom and painful fits that attend the Gout, that he was ever after (even to the very last of his old Age, and to the hour of his death) altogether freed from these pains. And *Franciscus Alexander* (in *Descriptione Diacorallii*) writeth likewise that one *Francis Pechius*, a man fifty yeers of age, and troubled with the Gout, was cast into Prison by a certain Marquess, and there kept twenty yeers; and that he was ever after this freed from the Gout. And *Solenander* also (in his 5. *Sect. Consil.* 1.) relateth of a certain Widdow, a Spaniard born, that having omitted and left off the use of Wine (which yet notwithstanding she had but very sparingly made use of after the custom of her Country, and alwaies diluting it with Water) she was never more after that troubled with the Gout. And there are many other such like known Histories of them that have either been cast into Prison, or else have been reduced unto poverty, and so have of necessity abstained from Wine, and thereby been freed from the Gout. To wit, whereas the next and most immediate Cause of the Gout (as we likewise told ye before) is some certain thing that hath as it were the Nature of a Mineral, and this altogether unfit for the nourishing of the body (such like as is to be found in al kind of Earths, but yet in some more, in some less) the Vine attracteth it more powerfully than other Plants (and that this is so, appeareth even from that Tartar which is to be found more abundantly in the Vine than in any other Plant, and in that Vines wil grow and thrive in those places wherein other Plants wil not prosper, as not having aliment enough; the Vines contenting themselves in a manner only with that very salt of the Earth) which afterward together with the Wine (although variously changed) is derived into Mans body, and being there heaped up it affordeth matter unto the Gout.

And yet notwithstanding there are likewise some kind of Meats and Drinks that make very much for the breeding of the Gout; and there are sometimes Waters to be found that generate the Gout; and in those places where the Gout is Epidemical not only the rich that drink Wine, but the poor also that drink Water, are afflicted with the Gout. And so likewise *Julius Alexandrinus* writeth (in his fifteenth Book of things that are wholsom, and sixt chapter) that he knew a certain person troubled with the Gout; in whom by the eating of Carps and Breams the Gout was perpetually bred. So that he could when he listed by this means bring the Gout upon himself. And moreover, Wines they are not al of them of one and the same kind. For some of them proceed from a sandy Earth, and contain less of this Tartarous matter. And such are those Wines that grow at *Jassen* (a Town hard by) called *Gorubergensian* Wines; which although that they be drunk in great abundance by the Inhabitants of that place, yet I never heard of any of them that was there troubled with the Gout. And such Wines as these are likewise to be found in many other places. But on the contrary, those Wines that grow in an Earth that is fat, muddy, clayish, stony, and that hath in it a Mineral Marl, gravel, stones, or any thing else that is Mineral mingled with it, are very apt and ready to generate the Gout; and such are the Wines of *Moravia*, *Bohemia*, *Hungary*, and most of the Wines of *Austria*. And although that the Wines that do not generate the Gout leave oftentimes in the Vessel more Tartar than those Wines that do indeed produce the Gout; yea, and if they be distilled, there is likewise more of the said Tartar found in them than there is in these (like as at *Vratislavia*) as that eminent and famous Physitian Doctor *Doringius* wrote unto me, of twenty four measures of Renish Wine there were found almost three ounces of Tartar; whereas in the distillation of as many Measures of the *Tocavian* Wine, that is accounted the strongest of al the *Hungarian* Wines, there were scarcely two drams of Tartar to be found, yet nevertheless al this maketh nothing against what we have said. For those Wines have that Salt or Tartar superficially only (as I may so say) and in a thick manner mingled together with them; or (that I may speak with the Chymists) they have the Salt as yet fixed; but these have a volatile Salt or Tartar most exactly mingled with them, insomuch that this Salt and Tartar is in a manner made spiritual; whereupon it is, that the former of these is more eafily separated either in the Stomach, or in the Liver, and so is thrust forth either by the belly with the rest of the excrements, or else it is voided by Urine; but this other being mingled with the spirit of the Wine passeth into the very Mass of the blood, and so penetrateth into the most inward parts of the body. And that those Salts that were fixed may be made Volatile, the Distillations of Chymists do sufficiently prove; and that the Tartar may be made as it were Spiritual, and elevated by the Alembick, this we are taught by the Tartarized Spirit of Wine: yea, and Metals may also be so dissolved in strong Waters and Spirits, that they may not only be strained through paper, but that they may likewise be elevated into the Alembick: But yet never-

The gout caused by the eating of Carps.

wholsom Wines.

Wines unwholsom.

 theless,

theleſs, in regard that this Salt although it be ſubtile, is altogether unfit for the nouriſhing of the body, as partaking of a Mineral Nature (which is not fit for the nouriſhment of living Creatures) albeit it doth together with the blood penetrate into the Veins; yet notwithſtanding as ſuperfluous and uſeleſs it is at length by Nature caſt forth of the Veins and Arteries, and thruſt out unto the Joynts. And therefore, whether or no Wine be apt to generate and cauſe the Gout, we are in the firſt place to judg of this by the place where it groweth, and its effect; and then next of al by the ſtrength therof. For by how much the ſtronger Wines are, by ſo much the more exactly and ſubtilly is this Salt mingled with them, and becometh more ſpiritual: like as it appeareth in the Spirit of Wine that is Tartarizated, which is more ſtrong than the ſimple Spirit of Wine.

All which notwithſtanding is thus to be taken, if by reaſon of the diſtemper and weakneſs of the Bowels (as we alſo ſaid before) that which in the Wine is Excrementitious and Tartarous, may not be ſeparated. For if it may be ſeparated, the Wine wil then be wholſom, and without any hurt in it. Yea, and if any ſuch Wine could be had that having but little of ſuch a like Tartarous matter in it ſhould yet ſtrengthen the weak Bowels that do not wel ſeparate theſe Excrements, and ſo ſhal help the Concoction and promote the ſeparation and evacuation of the Excrements, we grant that this would prove to be not only harmleſs, but likewiſe very uſeful and profitable if moderately drunk. And ſome tel us that the *Pucine* Wine is ſuch, and therefore they commend it for the prevention of the Gout. But I much doubt, whether this Wine be in al reſpects anſwerable unto what hath been ſaid; and therefore I conceive that it is good firſt to make trial, and to conſult with Experience.

Wine, how it doth generate the gout.

We have indeed above ſpoken ſomthing as touching the cauſe for which certain Wines breed and cauſe the Gout: but yet nevertheleſs, my deſire and purpoſe is here to explain the thing, and ſo to make the matter ſomwhat more cleerly to appear. I think it to be a very plain and cleer truth, that Wine produceth the Gout, not as it is Wine, but as it containeth in it ſomthing that is unfit, and ſomthing likewiſe that is extraneous, and unuſeful unto our bodies, which is therefore by Nature thruſt forth unto the Joynts. And this appeareth if by nothing elſe, yet by this, That there are ſome certain Wines that do not generate the Gout; and ſuch are our *Gorubergenſian* Wines, and many others alſo, that here in theſe Regions grow in Sandy places. For albeit theſe Wines be drunk for a dayly and ordinary drink, and that not ſcantly, but very plentifully; yet there was never any that from hence contracted the Gout. But on the contrary, the *Moravian*, *Bohemian*, *Auſtrian*, *Hungarian*, and likewiſe very many more Wines of other Regions, are moſt apt to breed the Gout. Yea, and not only the Wines, but even the Waters of ſome places, do generate the Gout. And ſo it was related unto me by that eminent Phyſitian, *Dn. D. Tobias Knoblochius*, that at *Iglavia* in *Moravia* (where he had practiſed Phyſick there for ſome yeers) that not only the Wealthier ſort of People that drank Wine, but even the poor who hardly ever taſted a Cup of Wine, were al of them very ſubject unto the Gout, Colick, and Fallingſickneſs, Diſeaſes Epidemical in that place.

In certain places waters alſo generate the gout.

What that is that maketh that certain wines are apt to breed the gout.

But now, Inquiry is to be made, What that ſhould be which maketh that certain Wines are apt to generate the Gout. Where we are firſt of al to take notice, that nothing doth nouriſh (touching which we have ſpoken elſwhere) but what proceedeth from things animated, or enlivened. And therefore al other things, as Minerals, Metals, and divers kinds of Earths, are unapt to nouriſh our bodies; and thereupon if they be at any time taken in, they are again to be evacuated either by the Urine, or elſe by the belly; and this if it be not done, they are then by Nature thruſt into the Joynts, and ſo they there generate the Gout. And therefore thoſe Vines that grow in a ſandy Earth, that is not at al fat and rank, have nothing that they may attract and draw unto them, beſides the Alimentary Juyce: but thoſe that grow in Clayiſh grounds, or any other fat Earths, do not attract unto themſelves only a vegetable juyce, but alſo a Mineral juyce as it were, and ſuch as is wholly unuſeful for our bodies, which is not unfitly termed Tartar, a ſubſtance, to wit, that conſiſteth of a fixed and volatile Salt, and of an Earthy and almoſt Mineral matter; ſuch as not only ſticketh faſt unto the ſides of Caſks, but is likewiſe throughly mingled with the ſubſtance of the Wine. And this is altogether the Nature of Salts, that they reduce other bodies into the ſmalleſt Atomes, and then do aſſociate the Atomes unto themſelves. We may ſee an Experiment of this in the diſſolving of Metals in ſtrong Waters, in which the Metals (bodies otherwiſe thick) are ſo united unto the ſalt of the Waters that diſſolve them, that they may paſs through a Card or Paper. And the very ſame we likewiſe ſee in the diſſolving of Pearls, Margarites, Corals, and Crabs Eyes, which ſticking faſt unto the Salt of the Vinegar, are throughly mingled

with

with the Water, and may be strained through a Card; but being precipitated they will dissolve no further. We have likewise an Example hereof in Vitriol, which being dissolved in Water may likewise be strained through a Card: but when the vitriol is Calcined, and the Salt drawn forth of it, there remaineth an Earth that is not dissolveable by any liquor whatsoever. And so in hot Baths of Water there is an Earthy substance so exactly mingled therewithal, that it cannot possibly be discovered by any sense. But yet when this afterwards shall stick fast unto the wooden and stony pipes, and shal subsist apart by it self, it is not then any further to be dissolved in Water. From all which it appeareth that the Gout is not generated without Salt; and without doubt the sharpest and most extream pains in the Gout are from Salt: but yet we say not that Salt alone, pure Salt doth this; since that there are Wines in many Regions that have Salt also, and yet for all that they do not generate the Gout; but there concurreth moreover a matter that is Clayish, Limy, Marly, or some Mineral which the Vine had attracted out of the ground, together with the nourishment, concocted it, and mingled it with the Alimentary matter and so communicated it unto the Grapes; and hence the Wine also that is presled forth of the Graps receiveth and retaineth it. And hereupon it is that we see, how that in the Joynts of such as are troubled with the Gout there are sometimes generated hard knobs and knots, and that there is as it were Lime taken forth of them; which indeed is nothing else but that same Mineral Matter which the Salt of the Wine drew along with it, and which at the length (as altogether unuseful and unfit for the nourishment of the Body) is thrust forth unto the Joynts. Now therefore (that we may come unto the Question, why some Wines do generate the Gout, and others do not so) the more any Wine hath of this matter, and this throughly mingled with it by the smallest Atomes, by so much the more powerful it is for the generating of the Gout. Which cometh to pass, in the first place, by Reason of the soyl, to wit, where the Wines grow, whether in a Muddy ground, or that that is Clayish, Limy, Marly, or any other Mineral Earth. And furthermore in the Second place, if the Wines shall not be wholly purifyed and freed from their Tartar, but still remain as it were thick and turbid; and this happeneth first of al in Wines that are new, and not yet wrackt by turning them from Vessel to Vessel; and then Secondly in some certain Wines that wil never be altogether cleer; such as are those of *Hungaria*, &c. And Thirdly, if that Tartarous matter be so throughly mingled with the Wine in the smallest Atomes, that it cannot be separated from our bodies, neither in the first, nor yet in the second Concoction; which for the most part happeneth in Generous and strong Wines, and such as grow in places hotter then ordinary. For Wines that are not strong and generous, although that even these may contain in them some of the said Tartarous matter: yet notwithstanding, in regard that the heat of the Country was not so powerful that it was able (either in the Vine, or in the Grapes,) to mingle this Tartarous matter with the Spirit that is in the Wine, it is thereupon also afterwards (either in the first, or in the second Concoction) more easily separated, and driven forth either by the Belly, or by Urine.

what wines they are that do more generate the gout, and what, less.

But if by the Air of a hotter Country, that doth concoct more powerfully, that same Tartarous matter be exactly mingled together with the Salt and spirit of the Wine, it then refuseth to be severed by the separating faculty, and so penetrateth it self into the whole Body with the Alimentary part. But yet because that it is altogether unfit to nourish the Body, it is at length by Nature thrust forth unto the Joynts, and there it generateth the Gout. And that this is so, we are taught by the experience we have even of the *Hungarian* Wines. For although (as experience it self testifyeth) they be most apt of themselves to generate the Gout; yet (as we told you a little before) it is observed in the destillation of the *Hungarian*, and *Renish* Wine, that there was more of the Tartarous matter collected out of the *Renish* then out of the *Hungarian*. Which happeneth for no other cause but this, to wit, that in the Wines of *Hungary* that Tartarous matter is by the smallest Atomes so exactly mingled with the spirit of the Wine, that together with the said spirit it may likewise pass through by the Alembick.

Carolus Piso, amongst those Causes from which the matter of the Gout is heaped up in the Veins, putteth likewise moist and wateriſh meats for one, as broths, raw fruits, and the like. But he doth this upon a false *Hypothesis* or Supposition, whilest he mistakingly determineth that the *Serum* or whey is a meer and pure Water;

whether meats that are moist and wateriſh do breed the gout.

water; whereas yet notwithstanding Experience it self teacheth us the contrary; and there was never any man yet known to get the Gout from the alone use of moist and watry meats, neither indeed can wateriſh humors possibly excite such great and so sharp intollerable Pains.

The suppression of the wonted Evacuations.

That which likewise maketh very much for the generating of the Gout is the suppression of the wonted evacuations. And hence it is that *Hippocrates* (in the sixth of his *Aphor.* *Aphor.* 29.) writeth, that Women are never troubled with the Gout but when their Courses fail them; of which notwithstanding we intend to speak more hereafter in the ninth Question. And so the same *Hippocrates* writeth (*Epid. 6. Sect. 8. text. 55.*) *that at* Abdera, Phaetusa *the Wife of* Pithous *having been before (while she was yong) very fruitful in bearing Children, upon a very long absence of her Husband from her her Monthly Courses left her, whereupon afterwards pains and rednesses arose about the Joynts. And the very same (saith he) happened also unto* Thaso *the Wife of* Namysias Gorgippus. And from hence likewise it is, that oftentimes those Persons are wont to fal into the Gout who have had old Ulcers in their Legs, or Fistulaes in the Arse suddenly consolidated or healed up, and the Fluxes likewise of other places wholly suppressed. For those humors that are wont to excite those long lasting Ulcers of the Legs, and Fistulaes of the Arse, are themselves also salt; and therefore if they be suppressed, they may produce the Gout.

whether every Error in things not Natural may produce the gout?

And here there are very many that are wont to be long and tedious in the recital of the Causes (external and internal), who wil not pass over in silence any one of those things we cal not Natural. But although that every Error whatsoever in the use of the things not Natural may produce a Cacochymy; yet we deny that every Cacochymy hath in it a sufficient power to produce the Gout. And of the rest of those things that are not natural, there is hardly any of them that of it self doth produce the Gout; but only that by overmuch motion, Anger, and Fear, the Paroxysm is excited; and the retention of the sweats doth also make very much for the producing of the same; and if the Person hath been long accustomed unto those sweats, the retention and suppression of them is an Argument that the Gout is very neer at hand. But yet we grant that excessive Venery doth make very much for the generating of the Gout, by weakning not only the Joynts and Nervous parts, but also the whol Body: and hence it is that by the Poets the Gout is said to be the Daughter of *Bacchus* and *Venus*.

Venery one great cause of the gout.

The gout sometimes Hereditary

The Gout is somtimes likewise hereditary; and a weakness not only of the Joynts, but of the Bowels also breeding the vitious humors, is from the Parents and Ancestors communicated to their Children and Nephews; whether this happen from the vitious seed; or else that the matter of the Blood in Persons troubled with the Gout is subject and enclined thereunto, from whence the vital spirits are generated, and all the parts do receive their nourishment. And yet notwithstanding it may so come to pass that Parents that are themselves affected with the Gout may yet beget Children not subject thereunto; and yet their Nephews may notwithstanding at the length be troubled therewith. And indeed there are some of this Opinion that those Children that are conceived in the very Paroxysm of the Gout, these shal likewise be born thereunto; whereas on the contrary, such as are conceived out of the fit of the Gout, these shal be safe and secure. But very few perhaps there are that beget Children in the very Paroxysm of the Gout: like as we see also that Epileptick Persons may out of their Fit beget Epileptick Children. For the truth is, it is not so that the very matter it self that exciteth the Paroxysm is imparted unto the Children; but only a vitious disposition thereunto, which alone is not sufficient for the producing of the Gout; but that there is required likewise an Afflux of vitious humors. And therefore if those Children shal observe an exact and careful Diet, it may then so come to pass, that the weakness which they contracted from their Parents may be abolished, or else it may be corrected; and humors fit for the breeding of the Gout may not be generated in the Body. And on the contrary, it may so happen that albeit the Child may not be troubled with the Gout, yet nevertheless the Nephew may be affected therewithall, to wit, if he augment by errors in the Course of his Dyet that vice and weakness that was communicated from the Grand-Father by the Father; and so that vitious disposition that was wel neer suppressed and might have been wholly abolished had he but used a good dyet, is now again by the Errors of his Dyet (as it were) renewed and revived. Unto which we may likewise add this, that the vice that is in the Fathers seed may somtimes be corrected and amended by the goodness of the Mothers Milk. And moreover these Morbifick seeds may likewise have their own times, in which they do at length discover themselves (like as we see it to be in Intoxications, and the poyson of a mad Dog) or else haply they altogether lose their strength, and so they quite vanish.

whether Children begotten out of the Paroxysm or fit of the gout, may yet be subject thereunto?

whether there be any necessity that the gout should be propagated unto the issue?

From

From all which it wil be no hard matter to render a Reason why the rich should be obnoxious and subject unto the Gout rather than the Poor; it being therefore by the *Germans* called also the Disease of the Rich. For it is very rarely found, that Boors or Beggars are troubled with the Gout; and hence it is also that the Gout is termed a Disease *hating the Poor*: and *Jovianus Pontanus* hath likewise a Fable to this purpose (in his 5. *B. de sermon.* and Chap 1.) that on a time the Gout rambling about, and going into the Country, when it saw there nothing but little Cottages most rudely and unhandsomly built, and very filthily scituated; and could find there nothing but Mattocks and Pitchforks, Rakes, and such like Rustical Instruments; she turns away from this place as altogether unfit for her entertainment, and betakes her self to the City, if haply she might there find better. But being brought into the City, at her first entrance thereinto, she lighteth upon the Shop of a Black Smith; and this she likewise passeth by as altogether unfit for her accommodation: but at length when she had a while rambled about in the City, she at last cometh into a certain house, before whose door was piping and Dancing, and within doors nothing but Jollity and Feasting; and demanding what and whose house this was, when she was answered, that it was the house of Ease and Idleness, and that it was inhabited by slothful Persons that spent all their time in Sleeping, Drinking Wine, and Feasting, she instantly enters the house, saying, This is indeed the house, and this the Palace that is fit for my reception and entertainment. And when at any time she saw sollicitude and Labor doing their business before the doors, she presently commands them to be set further off, and driven quite away; and chargeth that all Cares whatsoever should be banished from thence; and more especially, Sobriety and abstinence.

why the Rich are more troubled with the gout than the poor?

For Poor People and such as live in the Country are for the most part contented with a very sparing and plain Diet: whereas on the contrary, the Rich delight themselves with all variety of Meats, and drink their Wine most commonly without any stint at all; yea and oftentimes wholly addict and give themselves over to Gutting, Gluttony, and excess of Wine. And again the Boors in the Country are continually exercised with Labor, by the which the heat of the Bowels is stird up; and if at any time there chance to be any vitious humor it is immediately discussed; whereas for the most part the Rich do more indulge themselves in ease and idleness. And moreover the Rich are very seldom so careful to obey the prescripts of their Physitians as they ought to be, but they wil have the medicaments prescribed them to suit with their Fancies and Palats; neither wil they continue the use of them so long as is fitting and requisite; neither wil they have that care and regard unto the whol course of their Diet which they ought to have.

And besides all this, in the last place, the Rich do indeed make use of Physitians, but then they change them too often; and very frequently commit themselves unto Empericks, and others that are altogether Ignorant, or have but little knowledg of the case how it standeth with them; and these do oftentimes prescribe such remedies and medicaments as by the use of which the Disease is rather more deeply and faster rooted, than eradicated and pulled up.

Now this Disease is wont for the most part to invade and afflict men, rather than Women (not that these are wholly exempted from it, for we find the contrary by experience) and this more especially between the thirtieth and fiftieth yeer of their Age; to wit, because about that age, by reason of the sharpness of the heat, the salt and Tartarous humor is then more heaped up; and then after this the older they grow, the more they are afflicted with it, by reason of the weakness of the native heat, and the imbecillity of the expulsive faculty. For Men for the most part live not so temperatly as Women, sustain greater Labors, are more addicted to Venery, and hurt thereby. But Women (on the contrary) are more temperate, and besides they have likewise their monthly Evacuations, by and with which Nature is wont to thrust forth together with them all the vitious humors, and so to expel them out of all parts of the Body. Whereupon likewise it is, that *Hippocrates* (in the sixth of his *Aphorism. Aphoris.* 29.) writeth, that Women are not troubled with the Gout, until after their Courses fail and leave them. But the truth is, that it is not alwaies so that either Women or Men that are above or under the aforesaid age, are wholly free from this Malady; and albeit that *Hippocrates* (in the 6. *sect.* of his *Aphorism. Aphorism* 30.) writeth, that yong Men before the use of Women are not at all troubled with the Gout; and that it is a thing very rarely seen, that Youths are herewith affected, yet notwithstanding its sometimes found so to be, and that even these are troubled with it: as we may likewise see many that are above fifty yeers old taken oftentimes with the Gout. And I my self of late saw a Learned Man that in the sixty second year of his age was first of all troubled with

who they be that are most subject to the Gout.

fits

fits of the Gout. Neither also are Eunuches (although that *Hippocrates* in the *Sixth Sect.* of his *Aphorism. Aph.* 28. doth except them) alwaies wholly free from this Malady; as we shal anon shew you further in the *Ninth Question.*

Chap. 3. *Signs Diagnostick.*

The Diagnostick signs of the gout.

THe very Malady doth sufficiently appear of it self; and the sick persons complain of a pain about the Joynts in their Feet, Hands, Knees, and other parts; unto which there is afterward added a swelling, a redness, and for the most part a Feaver. And indeed, when the Gout begins first of all to invade a person, it likely taketh him first in the great Toe of his Foot, and that most commonly the left. And so in all the other joynts the pain most of all consisteth and staieth in the place affected, without spreading any further. But in the *Sciatica*, this pain is not felt only in the Joynt, (by the which the Head of the Thigh is inserted into the Hip) but it is from hence by the Nerves and Membranes carried unto the very Buttocks, by the way where the Nerves spring from the Loyns, and the great bone by the Latin Physitians called the *Os Sacrum*, or holy Bone; and from thence the pain is also extended unto the Calf of the Leg, and unto the Foot, according to the guidance and conduct of the Nerve. And in other Joynts also, (as lying outwardly) there is wont manifestly to appear a swelling, and redness, and a great heat to be perceived: but now in the Sciatick painful affect these things do not so plainly appear, in regard the place affected lieth very deep, and because that therein that place the top of the Skin hath not many Veins dispersed here and there in it. In a word; in the Gout that which most especially troubleth the sick person is the pain he feeleth, and an impotency in his motion; and upon this there follow watchings and restlesness, a dejection of the Bodies strength, and other Symptoms; all which *Lucian* in his *Tragopodagra* hath very elegantly described.

The signs of the Causes.

But now in reckoning up the signs by which the differences of the Causes and the different Humors may be discerned, the most of Physitians are very long and prolix; and they take much pains in reckoning up the signs of the Gout from the blood, Choler, Flegm, and Black Choler or Melancholy. But since that (as we told you before) those Humors cannot properly be said to excite the Gout, but only that they are either stird up and down by that Humor that is the Cause of the Gout, or that being attracted by the pain of the part affected they flow together thereunto; We shall therefore in this regard here spare our selves the Labor, further to treat of them.

But yet Nevertheless, if for the better ordering of the Cure the knowledg of the affluent Humor seem to be altogether necessary and requisite; it appeareth from the general discourse of an inflammation; in which we have declared what a pure *Phlegmone* is, and what signs it hath; as also the signs of *Oedematodes*, of *Erisypelatodes*, and also of *Scbirrhodes*, what signs these have; and indeed from the signs of the Humor predominant in the Body (which we have elswhere explained) and likewise from the qualities of the swelling, and by the observing of those things that benefit or hurt the sick person, it may easily be known what humor it is that floweth together with it.

And yet notwithstanding it is here acknowledged by the more learned and able Physitians, (even those who have asserted that the Gout proceedeth from divers humors) that there is little heed to be given, or regard to be had unto those signs that are taken from the Color, heat, or the like Accidents; since that very many things occur which may be the Cause, as of the Colour, so likewise of the heat and coldness of the Member, contrary unto the Nature of the peccant Matter. For the humor (as *Guainerius* saith) that is the true and proper cause of the Gout, abiding in the bottom of the Member, doth not for the most part change the superficies of the said Member; and so then the Color of the Member cannot afford us any sign or token at all: but it may possibly so happen, that a Humor abounding in the Body may by pain be stirred up and darwn unto the place affected, and there it may cause a swelling, and yet nevertheless it may not be the Cause of the Gout.

CHAP.

Chap. 4. *Prognosticks.*

Prognosticks of the gout.

I. THe Gout for the most part is a disease not Mortal. For albeit that the strength may be much impayred by pains, and for want of rest, (insomuch that the sick persons may at length be forced to take their Beds) yet this is not done, but in a long time. And we see that such as are troubled with the Gout do oftentimes live long, and attain unto old age; to wit, for this Cause, that Nature by certain intervals thrusteth forth unto the Joynts those vitious Humors from which other more dangerous Diseases might have been generated; and so by this means freeth the principal parts from vitious Humors.

II. If yet notwithstanding there happen any dangerous inflammations, or pernitious Feavers, or that Nature fayl and lie under the burthen, so that it can no longer expel the vitious Humors, the Patients life may then be much endangered. And if any such dangerous Symptom be Joyned together with the vehement pain of the Joynts (as suppose, a Deliry, the trembling of the heart, difficulty of breathing, cold sweats, and a weak pulse) it is then a sign that the sick person will die the very same day, or the day following.

III. But although the Gout be for the most part a Disease not Mortal, yet nevertheless it is very hard to cure; and it is commonly accounted the shame and disgrace of Physitians. For albeit (if the Disease be new) it may be cured without much difficulty: yet nevertheless, if it be long delaied, and that it often invade the party, it may be more difficult to cure, in regard that the Joynts, yea and the very Bowels are weakened by the pains, and restlesness, and likewise by the afflux of the Humors. And the sick persons are themselves oftentimes the Cause that this Disease taketh such deep Root in them, seeing they do not oppose and withstand the Disease at its first Invasion; yea and oftentimes they conceal it; and some there are that will pretend other Causes of their Disease, as loath to acknowledg it to be the Gout,

But now this Disease proveth afterward very hard to cure, both in regard of the many errors in Diet (from which the sick persons wil not be perswaded to abstain) and oftentimes also through the unskilfulness of the Physitians; who are either ignorant of the true cause of the Disease, or else they administer Medicaments that are very unfit and improper, by which they do rather weaken the Joynts and the Bowels then any waies strengthen them. But yet nevertheless, in the mean time, the Gout is not a Disease that in it self is altogether impossible to be cured; and this we are taught by the examples of many that have been freed from the Gout; of which more anon in the *Tenth Question.*

IV. Whosoever they be that being thus affected are grown in age, or have gotten about their Joynts *Callous* and hard knobs bunching forth; or that live an anxious and careful life; or have a dry and costive belly; these can none of them be cured by the Art of Man, or any human means, so far as I could ever yet find. *Hippocrates* in the Second of his *Predictions.*

V. If in the Gout there happen to be a loosening of the Joynt, it is then very difficult in the curing, or indeed altogether incurable. For although the Joynt may possibly be set back again in its proper place, yet nevertheless because that the Ligaments of the Joynts are made more loose, a perfect Cure is scarcely to be expected. And if likewise in the loosning that followeth upon the Gout the Cavity of the Joynt be filled up with a hard knotty matter, the Disease is then altogether incureable: for the Joynt cannot be put back again before that Tophaceous matter be taken away; and this will hardly ever be removed.

VI. Among all the several kinds of the Gout, the *Sciatick* pain is of all others the most grievous, not only in regard of the greatness of the pain it self, but by reason also of the grievousness of the Symptoms that follow thereupon. For by reason of the most grievous pain it causeth watching and a restlesness, kindleth feavers; and sometimes a loosning of the Joynt happeneth, upon which there followeth a lameness and a wasting away of the whole Leg and Thigh. For if at any time a Joynt fal out of its place, by reason of the multitude of the affluent Humors, there

is then a Necessity that an halting and lameness must follow upon it. But because that the bone being fallen out of its proper place presseth together the Muscles, Veins, and Arteries, the Aliment and Spirits cannot possibly flow into the lower parts, whereupon there followeth a wasting and Consumption of them.

VII. But although this *Sciatick* pain be of all others the most vehement, yet notwithstanding, it doth in the beginning more easily admit of a Cure then any of the other kinds of the Gout, in regard that the strength and Virtue of the Medicaments may more easily penetrate unto the Vessels, (by which the Humor floweth into the Hip) then unto the extream Joynts; and so likewise the Humor that floweth unto them may the more easily be evacuated. But if the Humor be once flown in, so that it hath insinuated it self into the Hip, it is then very hard to be cured; because that the Discussing Remedies by reason of the flesh lying upon the Joynt cannot penetrate whither they ought to go.

VIII. *They that having been long infested with the pain in their Hips have the Hip falling forth of its place, and again returning and falling into its place, these have snotty Excrements following thereupon,* (*as* Hippocrates *telleth us in the* sixth Section *of his Aphorism. Aphoris.* 59.) these Mucous and snotty Excrements having their original from the weak heat of the Nervous parts.

IX. *They that having been long infested with the pain of the Hips have the Hip falling out of Joynt, these have their Thigh wasting, and they become lame, unless they be burnt: as* Hippocrates *tells us in the same place, Aphorism.* 60. The Thigh indeed consumeth and wasteth away, because it is but ill nourished, by Reason of the weakness of the Native heat from the long continued afflux of the Vitious Humors; and because that the Veins and Arteries are moved out of their places, and pressed together, so that they cannot rightly bring the aliment unto the Thigh. But then they become lame, and halt, because that the Thigh for want of nourishment is destitute of strength, and by Reason of the Luxation or disjoynting is become shorter then before, and that by means of the loosness of the Ligaments the Thigh bone is not fast and firm.

X. Those unto whom the Gout is hereditary are scarcely ever wholly freed therefrom; and if they desire so to be, they have need to observe a far more exact kind of Diet and a more accurate use of Medicaments, then do others that are either not troubled at all with this affect; or if they be, the grief descends not to them from their Parents, or any of their Ancestours.

XI. If the *Varices* happen unto such as are troubled with the Gout, the Gout then ceaseth, (as *Avicen* tels us, because that the Humors that were accustomed to flow unto the Joynts are now derived unto the exterior parts of the Thigh.

XII. If the Gout that was wont to keep its certain Periods cease and return no more, it proveth to be the Cause of most grievous and deadly Diseases, unless the matter be drawn forth by way of prevention, which is most difficult to be done. For the matter that Nature was wont to thrust into the joynts, if by Reason of the weaknes of Nature it can be now no longer expelled, either it sticketh about the Bowels, and principal parts; or else being transmitted unto the Lungs, Intestines, or other parts, it there exciteth most grievous Evils.

whether the Gout may not be finished in less then forty daies and why?

XIII. As for what concerns the very Paroxysm it self, touching this *Hippocrates* writeth in his sixth *Sect.* and 49. *Aphoris. They that are troubled* (saith he) *with the Disease of the Gout, these may in fourty daies be cured of their fits, by removing the inflammation; provided that* (*as* Galen *adds in his* Comment.) The Physitian fail nothing in the Cure, and that the Patients be obedient unto his prescriptions. For seeing that the Humors in the Gout are dispersed by the Ligaments, Membrans, and Nerves, and that these parts are more thick, and more cold then the fleshy parts, it is therefore no wonder at all, that there is a longer time for the discussion of the Humor required in these parts, then in the fleshy parts. But yet this Aphorism is here only to be understood of the last and very utmost term; seeing that experience testifieth, that many have been Cured of the Gout within fewer then fourty daies. For in some the fits of the Gout are more moderate, and shorter, and so may be made to cease in a shorter time: but in others they are more sharp, and of longer continuance; and therefore require the longer time. And some there are that refer the cause unto the Humors; and those tel us for a truth, that the Gout which proceedeth

proceedeth from Choler is shorter, but that which is from Flegm of longer continuance. But be it so indeed, that sometimes the Blood, sometimes Flegm, and sometimes Choler may together and at once flow unto one and the same part; yet nevertheless, that very Salt Humor which is the next and most immediate cause of the Gout is sometimes thinner, (so that it may be the sooner and more easily discussed) and sometimes it is more thick. Unto which we may in the Second place add, the strength or weakness of the part affected. For the stronger the part is, the more easily doth it discuss the Humor that hath flown unto it; but the weaker it is, the more slow it is in dissipating the said Humor; and from hence it happeneth that those which first begin to be troubled with fits of the Gout have these fits shorter; and in such as have been longer troubled with this Disease the Paroxysms are of so much the longer continuance, unless they have the greater care of themselves. For the oftner any member is afflicted with the Gout, the weaker still it groweth. And Thirdly, the sick persons themselves also do not observe one and the same course of Diet; whereupon it is, that such of them as observe an accurate and exact kind of Diet, these are more easily freed; and some of them do by the Errors of their Diet much prolong unto themselves their Paroxysms, and give the Cause of a new fluxion.

XIV. The more, and the more frequent the Symptoms are that follow upon the Gout, the harder is the Disease to be cured. For sometimes by Reason of the most sharp and vehement pain, the sick persons do unseasonably desire repelling and stupefying Medicaments; which drive back the Humor that was flowing unto the joynts unto the more noble parts: and from hence it happeneth, that the sick persons fall into the affects of the Heart by Reason of its being streightned; into Faintings, and Swounding fits, or other mischievous Diseases: yea and they may be cast into great peril of their lives; and then the only hope they have of escape lieth in this; to wit, that the aforesaid Humors (if it possibly may be) be again driven back unto the joynts.

XV. Now there are four manner of waies to dissolve and cure the Gout. For first of all (and more frequently) the matter is resolved, and indeed all of it, so that there are not left so much as any footsteps thereof remayning; or (as for the most part) nothing but the very signs and footsteps of it are left behind: And *Secondly* (but this is more rare) the matter is changed into a substance very like unto *Pus*. For a true and genuine *Pus* it is not; but a certain *Sanies*, or thin Ichorous Excrement, sweateth back and Eateth its way through both the Flesh and the Skin. *Four ways of dissolving the Gout.*

But now why the Gout cometh so seldom unto a suppuration, is well worthy our consideration, and enquity. Some are of this Opinion, that it is therefore because that the joynts are removed from the Fountain of heat, and have not in them so much heat as is requisite for a suppuration. But that this is not the true cause, appeareth by this, that sometimes there ariseth an inflamnation in the ends of the Fingers, which yet nevertheless cometh unto a suppuration. And therefore a more true cause seemeth to be this, to wit, the Nature of this very Humor it self (as being Salt, and wheyish) which is not to be changed into *Pus*; but it is either inwardly dissipated; or if any of it be left remaining, it groweth and hardneth into knots and knobs. The Third way and manner is, when by Reason of the weakness of the place, the matter sticking over long in the part affected, is at length turned into a knot or knob. And of such a Gout as this it is that *Galen* writeth (in his 10. B. of the *Compose. of Medicam. according to the place*, and 2. *Chapt.*) *after that the Calli are once produced*, (saith he) *there is no further hope or expectation, that the Joynt should ever exactly return unto its pristine Constitution.* And of this the Poet, *Tollere Nodosam nescit, &c.* *Why the Gout is so rarely suppurated?*

That Physick worketh rare effects, ther's none can doubt,
And yet it knows not how to Cure the knotty Gout.

The Fourth manner is, when the Humor is transferred, and carried unto some other place, and (as it sometimes happeneth) unto the more noble Members, to wit, the Lungs, the Heart, the Brain; and this of all other the changes is the worst, and by reason whereof the sick persons die, unless the matter be drawn back again unto the joynts; and sometimes the Humor is translated unto the more ignoble

parts, as the *varices*, according to what we said before in the 11. *Prognost*: and sometimes it is evacuated quite out of the Body; and as *Rhases* tels us, it is oftentimes carried unto the Intestines, and there it exciteth a flux of the Belly, and excoriateth the said Intestines; and this flux continueth sometimes all the life after, and the strength by degrees and by little and little failing, (by reason of Feavers and pains) the sick persons after long wasting and consuming by Marasms, at length they die.

Chap. 5. *The Indications and Cure.*

The indications & Cure of the Gout.

SInce that the perfect Cure of preternatural affects doth chiefly consist in the taking away of the Causes, and that the Authors (as we told you before) differ among themselves as touching the Causes of the Gout, it is therefore no wonder, that there is so great a discord among them about the Cure, some propounding one way, and some another, for the Curing of this Disease. Which difference and variety of opinions; (as we have sometimes already told you) hath not been the least (but indeed the greatest) cause why so few of those troubled with the Gout have hitherto been cured thereof; each Physitian here setting himself to oppose that as an enemy which he hath often to himself fancied so to be, and in the mean time altogether neglecting that which is indeed the true enemy. And this evidently appeareth from the *Consilia* or advisings of Physitians one with the other (which have likewise been in the behalf of persons of the greatest worth and quality) in the most of which (opinions being asked, and resolves sent from one to the other) the whole result of the business for the most part came to this, that the Cure was chiefly to be directed to the head, as the commanding Member; and unto the Joynts, as the recipient Member. And so the authority of *Fernelius* alone (a Physitian otherwise of great learning and experience) hath drawn very many into the same error with him, and kept them from searching after the truth; and hath likewise caused that many sick of this grief have taken such Physick, and several sorts of Medicaments that were very unfit, and altogether improper for them. We therefore (leaving unto every man his Judgment and Opinion) insisting upon those Fundamentals which we have above propounded, will here briefly declare our Opinion as touching the way and Method of Curing the Disease we are now treating of.

Why so few have been Cures of the Gout.

The Cure of the gout

Now the Cure so called in general consisteth in two things: the former whereof is, that the present Paroxysm (whether Pain, Swelling, Impediment of the motion, and all other things that are wont to be troublesom unto such as are afflicted with the Gout) be taken away. And the other is, that a course be taken to prevent the return of the Paroxysm being once removed.

And in the first place indeed, for the manner of Curing the Gout that is present, there are three things especially, which (in the Paroxysm) the Patient desireth a speedy removal of, *viz.* the Pain, Swelling, and the Impediment of his motion. And now seeing that all these three have their original from a preternatural Humor fallen into the joynt, the total removing of the Paroxysm consisteth in this, that the influx of the Humor be withstood, and that the Humor already fallen in be taken away. For that Humor being removed, there followeth both a cessation of the Pain, and a vanishing of the swelling, and the motion of the part again returneth. But yet nevertheless, in regard that the pain doth oftentimes so extreamly excruciate and Torture the sick Person, that he cannot well bear it (until the Humor the Cause thereof be taken away) the pain is therefore sometimes first of all to be moderated, yea even before the Cause be wholly removed. And so then the whole Cure of the Gout afflicting the sick Person consisteth in the taking away of the Cause, and the mitigation of the pain.

As for the first of these, seeing that the flux taketh its beginning from the motion and boyling as it were of the blood and Humors in the Veins, that motion and boyling of the Humors is first of all to be stopt; and the Humors that with violence rush unto the part affected are not only to be turned another way, but they are also to be wholly evacuated, and emptied forth out of the Body; for unless this be done,

done, the pain wil be but the more exasperated. And afterwards the humor that hath flown in is to be discussed and scattered. And because that pain is the thing that chiefly grieveth the sick Person, this is sometimes also to be mitigated even before the Cause be taken away.

And therefore if any Cause, either external (to wit, the distemper of the Ambient Air) or the thicknes of the body shal have given the occasion, it is forthwith to be removed, yea and also to be corrected after a quite contrary manner.

Venesection.

And secondly, If Blood abound in the Body (which may be also so moved by the violent motion of the humor that it may as it were boyl, and by the pain be attracted unto the part affected, and so concur as a Joynt Cause of the Gout, and may possibly likewise augment the Malady) and that moreover a Feaver be threatned as neer at hand, or else if it shal accompany it; then in this case (if the Patients strength wil bear it) Blood-letting is to be instituted, that so the afflux unto the part affected may be diminished, and that that fomenteth & addeth fewel unto the approaching Feaver may be withdrawn, and yet notwithstanding so that there be not too great a quantity of the Blood evacuated. But if there shal be no danger at al threatned by the abounding of the Blood, or that also a flegmatick humor aboundeth, Venesection is in this case rather hurtful than any waies useful and profitable, in regard that then by the evacuation of the Blood the Spirits may be dissipated and the Native heat wasted; whereupon the heat in the part affected may be so weakned, that it may not be able to overcome the humors in the part affected, and so easily to scatter them; and hence it is that the Patients are longer ere they can recover their strength and health: yea and sometimes also there are by this means hard knobs and knots generated in the Joynts. And if all or most part of the Joynts be affected, then the basilique Vein (either in the right or left Arm) is to be opened. But if one only Joynt be affected, then the opposite Vein is to be opened. As for example, if the Joynts in the right Arm be affected, the Vein in the left Arm is to be opened: and so on the contrary. If the right Foot be troubled with this grief, then the Vein of the right Arm is to be opened; if the left Foot, then the Vein in the Arm is to be opened on the same side. For this is more commodious, than to open the Vein in the Foot of the opposite side: for by that former Venesection the fluent humors are drawn back; whereas by this latter they are only derived unto some other part. And the like is to be done if the pain be in the Hip. *Venesection.*

Venesection in the Arm (in the Sciatica pain) being premised for derivation, a Vein may afterwards very fitly be opened in the Ham, or neer unto the interior Anckle (or also the exterior) in the Vein there appearing, which (by reason of the great benefit it bringeth unto the sick Person, if it be then, and that in due time opened) they cal the *Ischiadick*, or Sciatick Vein, which (and that very often) alone cureth this Affect. But yet for the most part it is opened in the pained Thigh; although that *Platerus* writeth, that upon the opening of a Vein also in the sound and unpained Thigh very great benefit hath followed thereupon, and that all the pain hath thereby been suddenly and unexpectedly taken away,

But in regard of the urgency of the Malady, and that the Flux cometh very speedily, therfore even forthwith (if there be occasion) Venesection is to be instituted, and as much of the Blood as is needful (if the strength of the Patient wil bear it) to be taken forth at once opening of the Vein. But if the Patients strength wil not bear nor allow of a more large evacuation of the Blood all at once; then at several times, and by intervals so much of the Blood is to be drawn forth as may answer unto the Bodies fulnes thereof. Instead of this Venesection Cupping-glasses may also be applied, which are wont to be affixed (in the very first beginning of the Pains) unto the sound opposite part with Scarification. And so likewise Leeches applied in the accustomed places for the Hemorrhoids bring some kind of benefit unto the sick Person by their drawing forth the Blood. *Cupping-glasses, and Leeches.*

Purgation.

These Revulsions by the Evacuation of the Blood being thus made, purging is then next of all to be appointed unto the Patient; touching which although there be some that think otherwise (as we shal afterwards further shew you in the 11. Question) yet for the most part it is very fitly and successfully administred. But it is instantly to be ordained (even in the very beginning of the pains, or if occasion be, when they are suspected as nigh *Purgation.*

at hand) before such time as by the said pains, as also by restlessness and want of sleep; or by the augmentation of the Feaver the strength be too much impaired; neither need we here to expect any Concoction, or use any preparation before; which most of the Physitians of former Ages were wont to do, who first of all made use of Lenitives, and then Secondly, Preparatives (or Digestives as they call them) for some certain daies; and Lastly, of Purgers that draw the humors from the Joynts. For even then when the humors have already before been in their motion, and are become thin, and that Nature her self endeavoreth the separation of them, as burthensome to her, from the good Blood, (and that there is cause to fear lest that, as we said before, ere ever any such things as these can be done and finished the humors may rush unto the Joynts, and that by pain and want of rest the strength be too much dejected, and that a Feaver following thereupon forbid a Purgation) even then the Purgation is forthwith to be instituted. And the exhibition of one only Purge doth for the most part less hurt and offend the stomack than those so often repeated digestive Potions, which resolve and weaken the Stomack, so that the Crudities being afterwards augmented, there is caused a greater afflux of humors unto the Joynts.

Altering Medicaments.

Alterers. Yet nevertheless, if the humors be over-hot and sharp, they may be attempered by Broths altered by Cichory, Endive, Sowthistle, Purslane, Sorrel, and Medicaments made out of these: neither are we to omit the administring of the Conserve of Roses with the *species Diatrion santalon*, it being of singular use in the altering of the humors. As,

Take *Conserve of Roses three ounces, Spec. Diatrion sant. one dram, Red Coral one scruple, and with the Syrup of Pomegranates make an Electuary.* Or,

Take *Margarites prepared one dram, Red Coral prepared, and all the Sanders, of each one dram and half, Red Roses one dram, the Bone taken out of the Staggs heart one Scruple, and make a Pouder. Or else with Sugar dissolved in Rose Water make little Rolls.*

But now as touching Purgation, we are to advise you in these two things especially. First, that a fit time be made choyce of (as we gave notice before) and that the Purgation be not too long deferred. For if already the whol humor be flown in unto the Joynts, it is easily called back. And therefore, that the humor which is now ready to flow into the Joynts may be turned unto the belly and by it be evacuated presently in the very beginning of the Paroxysm (yea and also so soon as ever we do but suspect it to be nigh at hand) the Purgation is to be ordained, and administred; for by this means the humor that is now flowing, and that which was after to flow, is evacuated by convenient places, and hindred that it rush not to the part affected; and the encrease of the pain and swelling is hereby prevented; and so that which hath already flown in unto the part affected is easily dissolved. And experience it self testifieth that this kind of Cure hath profited very many. And so *Petrus Bayrus* writeth of himself, that he himself being by four men carried to the Close Stool, after that he had four times eased his Belly (having before taken his own *Caryocostin.* Electuary) he was freed from all his pains; and that he could then go without help from any other.

And then Secondly, It is to be considered, by what Medicaments the Purgation is to be instituted and begun. Some think that we ought to abstain from the stronger sort of Medicaments, and to make use only of those that are more mild and gentle (or of the stronger in the smallest quantity) because that a strong purge may draw store of humors from the more ignoble and external parts unto the more noble; and so it may sometimes happen that some of these sick Persons may by a vehement and strong Purge fall into burning Feavers, as also Feavers Malignant and Mortal. Which as we willingly grant, and think that the humors that were hot before are not by vehement Purgers to be more inflamed; and that the motion of Nature is not altogether to be disturbed: so also on the other hand we conceive that great care ought to be taken, that the humors be not only stirred and moved up and down in the Veins, and not wholly drawn forth, and sufficiently evacuated. Which when it happeneth, they afterwards rush with a greater violence unto the part affected, as unto the which they are withal attracted by the pain. And therefore in the beginning of the Paroxysm, or when it is nigh at hand, we ought to make choyce of Medicaments that are somwhat stronger than ordinary; and yet notwithstanding such as do no way offend the Stomack. For (as we said before) if we make use of those that are too gentle and weak in their operation, the humors are then only moved up and down in the Body, and nothing worth speaking of is evacuated; whereupon there is afterward a greater Conflux unto the part affected.

But

But now, that during the purgation there may be no Conflux unto the part affected, and that the Humor being moved by the Purgation may not ruſh unto the part affected, this we ought carefully to prevent; and it is done by placing the part affected in a higher place in the Bed, until the Purgation ſhall be fully finiſhed; or (which is the more ſure and certain way) by impoſing a defenſive Medicament (after the adminiſtring of the purge) upon the head of the part affected. As for example, if the pain be in the Hand, the defenſive is to be placed upon the Shoulder; and this may be made and provided of the *Flowers of Roſes, Pomegranate flowers, Roots of Biſtort, Tormentill, the greater Conſound, the Rinds of Pomegranates, Bole-Armenick, mingled with the white of an Egg, and Roſe water, or Vinegar.* And that this Cataplaſm being dried, and ſo made hard, may not excite Pains, and thereby further provoke the flux, a little of the *Counteſſes Unguent*, or of the *Oyl of Roſes Omphacine*, is to be added thereto. Or elſe inſtead of the Cataplaſm, a ſwathe that is long enough may be wet in poſſet (in which Oak-moſs, Red Roſes, or other Aſtringents even now mentioned have been boyled) and drawn over the upper part; as for inſtance, (in the Gout of the Feet) upon the part above the Knees. And thoſe Defenſives are to be continued ſo long as the Purgation laſteth, yea for the whole day, as we ſee occaſion.

But now we cannot in general define, with what kind of Medicaments this purgation is to be performed, in regard of the great variety there is in Bodies. For although the Humor (the nigheſt cauſe of the Gout) be wheyiſh, Salt, and Tartarous; yet nevertheleſs this very Humor is in divers Bodies conſtituted after a different manner; and hurrieth along with it other Humors alſo that abound in the Body. Yea and in one and the ſame Body the ſame Medicaments are not alwaies fit and proper, becauſe that the ſtate of the Body is not evermore one and the ſame. And therefore the Phyſitian ought to be preſent with the Patient, when he preſcribeth ſuch like Remedies.

Now for the Evacuating of Serous Humors, and Cholerick *Ichores*, ſuch as theſe following ought to be provided, *viz. Syr. of Roſes* ſolutive, *de Spina Cervina*, (*commonly called the Domeſtick Syrup*) *Manna, Mechoacan, Sene, the Seeds of wild Saffron*, and the compounds from any of theſe; as alſo *Electuar. Diacatholic. Triphera Perſica, de Succo Roſarum.* And ſo likewiſe in the ſtronger kind of Medicaments, thoſe are of ſpecial uſe that are made of *Hermodactiles*; and among them the *Caryocoſtine Electuary* of *Bayrus*; of which we ſhal anon make further mention, when we come to ſpeak of the *Preſervation* from the Gout. Or,

Take *The Choyceſt Turbith, and Hermodactiles, of each three drams, Diagridium one dram and half, Ginger and Maſtick, of each a dram; Sugar ſix drams; make a Pouder hereof; the Doſe whereof is one dram, or a dram and half, with fleſh broth.*

Or, Elſe let the Patient make uſe of the Pills of *Rhaſes*, which (as he writeth in his 9. *B.* to *Manſor. Chap.* 90.) will preſently make and enable thoſe that keep their Beds to Riſe, ſtir and walk up and down; and they are in this manner to be Compounded.

Take *Aloes one dram, Scammony half a half peny weight, red Roſes a double quantity to the former, Hermodact. half a dram.* Make pills thereof, and give them all at once, and yet not without regard unto the ſtrength of the Patient.

But now, although the ſerous or wheyiſh Humor be the nigheſt cauſe of the Gout; yet notwithſtanding becauſe that this Humor doth alſo violently carry along with it other vitious Humors in the Body (and eſpecially when the pain cometh) the Phyſitian therefore ought to be preſent with the Patient, when he is to preſcribe ſuch various purging Medicaments for the preſent occaſion of the ſick Perſon.

Vomitories.

A Vomit is likewiſe very uſeful in ſuch as are accuſtomed thereunto; and ſeeing that it may Evacuate the Humor by a ſhorter way, there is no ſuch cauſe to fear the ruſhing of the Humors unto the part affected. *A Vomit.*

And yet notwithſtanding we dare not here give ſuch ſtrong Vomitories that may evacuate the Humors out of the very Veins; but it will be ſufficient if ſuch be adminiſtred

miniſtred that do evacuate the firſt waies and the parts neer unto the Stomach. For if there be many vitious Humors reſiding about the Stomach, Spleen, and the hollow of the Liver, and in the places neer thereunto, it may very eaſily come to paſs, that theſe Humors being ſtird up and down throughout the whole Body, they may both penetrate unto the Veins, and ruſh unto the part affected. And purges may be likewiſe appointed unto the ſick perſon after his vomiting; yea and if one purgation will not ſerve the turn, it is again a Second time to be repeated. *Franciſcus India* (in his 2 *B.* of the *Gout*, and the *Third Chapt.*) doth here wonderfully extol a Vomitory that he maketh of *Butchers Broom*, a ſufficient quantity of the pouder thereof, given with the *deſtilled Water of unripe Oranges* a little warm; which (as he writeth) can with ſpecial benefit unto the ſick perſon Evacuate both the Choler and the Flegm, not only upwards, but downwards alſo.

Sudorificks, or *Sweaters.*

Sweaters. The Body being ſufficiently purged, we are to endeavour that ſweat may be provoked, either of its own accord, or elſe by adminiſtring of Medicaments: For (as *Crato* writeth truly, in his 24. *Conſ.*) if the ſweat be at all deteined within, and hindered from coming forth, (eſpecially if the Patient hath been accuſtomed thereunto) it will not be long ere a fit of the Gout come: yea and without all doubt, the Paroxyſm will be much augmented and provoked, if in it the ſweat be deteined, and if the remainders of the wheyiſh Humor in the Veins be not diſcuſſed and Scattered; and on the contrary, the Paroxyſm wil be the ſhorter, if the *Serum* or Whey be by ſweat diſperſed. But ſince that in the firſt invaſion of the Gout there is as it were a certain kind of boyling of the Humors, and that for the moſt part there is likewiſe preſent a Feaver, in this regard hot ſweaters (ſuch as are *Treacle*, *Mithridate*, and the like) are here ſcarcely fit and convenient, becauſe that by them the Humors may be the more inflamed. But yet *Harts-horn* (either crude, or prepared without any burning) may be very fitly exhibited, either alone, or with the Water of *Carduus Benedictus*. And ſo likewiſe *Diaphoretick Antimony* is very uſeful. But if the Conſtitution of the Body, and the diſpoſition of the Humors wil bear it, the Decoction of *Saſſaphraß*, or *Sarſaparilla*, or *Chyna*, may be adminiſtred; which yet nevertheleſs we ought to temper with *Succory*, *Endive*, *Sowthiſtle*, and *Dandelion* or *Lions Tooth*. But yet al thoſe things that are uſeful in the Paroxyſms, for the diſcuſſing of the Humors either ſenſibly or inſenſibly, they have not all of them their place here in the Cure. And ſo likewiſe the Decoction of the greater Dock, or Burr (in regard that it cutteth, diſcuſſeth, moveth ſweats and Urins) is very uſeful; and *Forreſtus* relateth that *Vaſtellius*, a Penſioner at *Mecblin*, when he was forced to keep his Bed by reaſon of the pains of his Joynts (inſomuch that he was not able to move or ſtir any one Member) he drank warm Beer in the which there had been boyled the Root of the greater Dock; which having drunk up, (when he could not be cured by any other remedies of the Phyſitians) he made a great deal of white Water, (his Urine being like Milk) and ſo was freed from all his pains. Or,

Sweaters of what kind they muſt be.

Take *Sarſaparilla*, *one ounce*, *Saſſafras Wood half an ounce*, *the Root of the Clove Tree one ounce*; *Citrine Saunders two drams*; Infuſe all in three pints of Water, for twenty four hours, and afterward boyl the ſame; and give of this Decoction one draught in the morning, either alone, or elſe with Harts horn.

Topicks.

Topicks. The Body being thus in a due manner evacuated, and the Antecedent cauſe (that would have augmented the Diſeaſe) being once taken away, we then come to the very moderating of the pain, and the taking away of the Conteining Cauſe of the pain and ſwelling, and ſo unto the Topicks. But if Topicks ſhall preſently be adminiſtred, before thoſe Univerſal and General Remedies ſhall have been firſt made uſe of, the Patient ſhall receive from thence far more hurt then benefit. For either the matter which Nature endeavoureth to thruſt forth to the Joynts is driven back unto the more inward parts (from whence very grievous Symptoms are excited:) or elſe it is impacted into the Joynts, and ſo the pain is exaſperated: or elſe the part

part is effeminated and made weak, and loosened; and so the flux is increased. Which being not commonly taken notice of, and Topicks being oftentimes most unseasonably and without any caution at al administred, the sick persons do for the most part receive more hurt then good from them; and from hence it was that the common and received opinion had its first original, to wit, that the best course is, to administer nothing at al unto the pained Joynts. And the truth is, that it is far better to apply nothing at all (but to commit the whole business to Nature,) then to make use of such Medicaments as are altogether unfit and improper.

Now the Topicks that are applied, they respect either the pain only, or else withall the Cause of the pain, to wit, the Humor that now and formerly hath flown in, exciting both a pain and a swelling.

Mitigaters of Pain.

Mitigaters of Pain.

The Pain in this Disease for the most part is a most grievous Symptom, and which is most troublesom to the sick parties, and which they most of all Curse and Bann, (as *Lucian* hath it in the beginning almost of his *Tragopodagra*) and therefore also it is that they most of all desire the removal thereof. And indeed it is altogether necessary that the Physitian should have regard thereunto, because that if it be too great, it causeth a restlessness, dejecteth the strength, and by attracting the Humors it augmenteth the Malady, and so deservedly draweth our care unto it, for its removal; (as *Galen* in the 12. of his *Method*, C. 1.) and thereupon it sheweth, and pointeth us unto the aswaging thereof by Anodynes. Now Anodynes or Mitigaters of pain have likewise this Good and benefit going along with them, to wit, that by loosning the parts they make that the Humor that before flowed only unto the interiour parts about the Joynts, comes now also to flow and be diffused unto the Ambient and fleshy parts. And hence it is that the pains in the Gout, before the swelling of the part, are most Vehement and intollerable; and that so soon as the part affected begins to swel, they are much Mitigated.

But now these Anodynes of what kind they are, we have told you elswhere, (in our *Institutions*) to wit, such as mollifie and loosen the part affected, and yet do not discuss the very Cause it self. And here they may be provided of Goats Milk newly drawn out of their Dugs, as also white bread and Milk, together with the Yelks of Eggs, and a little Saffron; as likewise of the Leaves of Marsh-Mallows, Mallows, Colewort, or Cabbage, laid upon the place affected as hot as the Patient can well endure them; as also of Mallow Seeds, Seeds of Marsh-Mallows, Quinces, Fleabane, (and especially the Mucillages of them) Cassia newly drawn out of the Pipe with the Decoction or Water of Nightshade; which (as *Avicen* tels us) is the best Remedy that can be; unto which (if there flow any hot Humors thereunto) we may add some of the Oyl of Roses, or Rose water; but if the flowing Humors be cold, then we are to add thereto the Oyl of Camomil: and instead of Cassia out of the Pipe, we may likewise make use of the Rob of the Elder Tree; of white bread and Wine; and indeed if the Humor be more hot, red Wine; but if cold, or betwixt both, then white Wine with the pouder of Camomile flowers and Oyl of Roses; of Cheese new made of sheeps Milk, and imposed upon the pained part, and often changed; of fresh-made Ox or Cow dung in the first beginning of the Spring, as also the Water that is distilled out of it. A most useful Remedy also is the *Mucillage* of *Fleabane Seed* extracted with the Water of Roses or Night shade; unto which sometimes a little Vinegar may be added; and this Medicament is by *Serapion* and others very much commended.

In the very first beginning of the Disease, *Solenander* taketh the thick stalks of Hemlock, and fils them with Salt, and then stoppeth them with Clay or Paste, and puts them in a moist place that the Salt may dissolve; which liquor he keeps in a glass, and with Clothes applieth it unto the pained part.

And he oftentimes also made use of this Cataplasm:

Take *Mallows, the whole Herb, Root and all, cut it into very smal pieces; and boyl it in equal parts of Wine and Vinegar, in a new Earthen Vessel, until a third part be wasted away; and then mingle therewith the thicker Bran of Rye, as much as will suffice for the making of a Cataplasm, and apply this hot unto the grieved part.*

Forrestus

Forreſtus relateth, that he knew one that added hereunto a little Barly flower, and that of the Water Lentile, boyled in Milk with Camomile flowers; and ſo reducing them into the form of a Cataplaſm, he put them upon the part affected with miraculous ſucceſs, as one could judg no other of it. And here alſo very uſeful is the Yelk of an Egg reduced into the form of a Liniment with the Oyl of Violets; and ſo is alſo the Water of the Sperm or ſeed of Frogs, which perhaps have in them ſome kind of Narcotick quality. *Adrianus Spigelius* writes, that among the *Moravians* there is in uſe a very notable Remedy, and noble experiment (for the ſpeedy curing of the Gout-pains) to wit, the *Water* of *Meadow Sweet*, diſtilled with its Roots and Flowers; and this water is likewiſe in frequent uſe among the *Sileſians*. And it is alſo very convenient to foment the part affected with the Decoction of *Parietary* or Pellitory of the Wall.

And very many there be likewiſe that make uſe of Oyls and Fats. But here we are to give you this Caution (and good cauſe there is alſo for it) that theſe Oyls and Fats are warily and carefully to be made uſe of. For in regard that the Gout hath often ſome kind of alliance with the *Eryſipelas* as to the cauſe thereof; and that it is a thing generally wel known, how that all fat things that ſtop up the pores in the *Eryſipelas* do more hurt than benefit; the very ſame ſeemeth likewiſe to be feared in the Gout, leſt that the Pores being ſtopt up by theſe fats, the humor being detained within, the pain may be augmented; and this even [illegible] experience teſtifieth. And it was related unto me by a certain honeſt Neighbor of mine, [illegible] himſelf in the aſſwaging of the Gout pains in his own Body, found nothing to [illegible] Cheeſe of Sheeps Milk new and freſh made, and laid on, but often renewed. For no ſooner did the Cheeſe begin (being made hot by the heat of the part) to become fat, and to drop forth butter as it were, but (as he ſaid) his pain was thereupon very much increaſed.

Take *the Pith of wheaten Bread half a pound, and boyl it in as much new Milk as wil ſerve to make a Cataplaſm: and then add of the mucilage of Marſhmallow ſeeds two ounces, the meal of Linſeeds and Fenugreek of each two drams, Powder of Camomil flowers and Melilote, of each one ounce, Saffron one dram, Oyl of Roſes and Camomil, of each half an ounce, and mingle them wel together.* Or,

Take *Milk newly come from the Cow one ounce and half, Crumbs of white Bread five drams, Barly meal one ounce and half, the common Hermodactyles ſix drams, Saffron one dram. Oyl of Camomile as much as wil ſuffice, and make hereof a Cataplaſm.* Or,

Take *white Bread ſix ounces, Milk as much as wil ſuffice, and mingle them wel at the fire; and then add the Yelks of two Eggs, Electuary of Roſes two ounces, Saffron one ſcruple, and mingle them.* Or,

Take *the Meal of Barly, of Beans, of the bitter Vetch* Orobus, *of each one ounce, of Linſeed ſix drams, the Powder of Camomile flowers three drams, of Melilote two drams, of Saffron one ſcruple; boyl them in a ſufficient quantity of the Water of Camomile flowers; then add the Yelks of two Eggs, Oyl of Camomile and Roſes of each one ounce, and mingle them.* Or,

Take *the ſoft Crumbs of Wheaten Bread one ounce, Powder of the Mullein flowers two ounces; boyl them in Milk; and then add of the flower of Caſſia one ounce, and mingle them.* Or,

Take *of Linſeeds and Fenugreek ſeeds equal parts of each: let the Mucilage be drawn out of them with Roſe-water; and then add the yelks of two Eggs, and a little Vinegar; and then ſprinkle in Bean Meal, and make a Cataplaſm.* Or,

Take *Meal of Barly, of Linſeed, of Fenugreek, of Beans, Powder of Camomile flowers, of each half an ounce; Marſh-mallow Roots one ounce, Oyl of Roſes and Camomile, of each one ounce and half; Yelks of three Eggs, the Rob of Wine one ounce, mingle them and make a Cataplaſm.* Or,

Take *the flowers of Mulleyn as much as you think fit; infuſe them in a ſufficient quantity of Red Wine for two months, and then let them be diſtilled; let the place be fomented with the diſtilled water, and then after anoynted with the Oyl or Liquor of Mulleyn flowers that is in the Summer time collected by the Sun-beams in a Glaſs cloſe ſtopped.* Or,

Take *the yong and tender buds of the Hazel Tree; preſs the Oyl out of them after the ſame manner as it is wont to be made of Linſeed. The Body of it that remaineth after the preſſing forth of the Oyl, let it be burnt; and out of the Aſhes let there be the Salt drawn forth with pure ſpring water, and let this be mingled with the aforeſaid Oyl. The Oyl when it is mingled with the Salt, let it be clarified by pouring and paſſing it through a Box*

of

of Wood (as Painters are wont to clarifie the Oyl of Linseed for their own use) and so it becomes a very excellent Medicament for the mitigating of pains.

But now these very Anodynes themselves may be somwhat varied according to the quality of the humor; and in a humor that is more hot there may be added some certain things that are cooling, as *Roses*, and the *Water* that cometh from them, *Plantane Water*, and the like. But in a cold Cause the *Flowers* of *Camomile* and *Melilote*, *Wormwood*, *Linseed* and *Fenugreek* may be added.

Narcoticks.

If Anodynes be not sufficient for the aforesaid purpose, then Narcoticks are to be made use of; which in regard that they bring a certain kind of numness upon the part, they do not only forthwith assuage the pain; but they likewise (by their heat which they obtain) do also withal resolve the humors, and so with benefit and safety (and without any danger at all as it is thought) they may be made use of, as *Platerus* writeth in the 2. *B.* of his *Practice*: and therfore he (as likewise many others have done) much commendeth the Leaves of Henbane, and Mandrake, and Poppy, if while they be new they be first bruised or boyled, and so laid upon the part: and their Oyls are also very useful; and so is the Juyce also that is pressed forth of them and used for a fomentation; as likewise the Root of Mandrake and Henbane seed applied together with other things in the form of a Cataplasm. The new and fresh Leaves likewise of Tobacco, bruised and laid upon the pained part do assuage the pain. And the same *Platerus* (as likewise other Authors) have here recourse unto *Opium* also, and they mingle it together with other Anodynes; and unto two ounces of these they add a dram of *Opium*. And he writeth also, that if it be dissolved in the infusion of the Spirit of Wine alone, or the infusion of Saffron (four ounces of the yelloweſt of it) and one scruple of Camphyre with a dram of Opium, and the part where the pain is be wel washed or bathed with the said Liquor, it is a most efficacious and soveraign Remedy. And so likewise the Opiate Antidotes, as Treacle, Mithridate, Philonium, may be added while they are new, especially in case the quantity of the Opium may be augmented. *Narcoticks.*

And yet notwithstanding we are not to continue long in the use of these Opiates, in regard that they are enemies unto the native heat, and Nerves.

And yet nevertheless the same *Platerus* tels us (in the first *B.* of his Practice, Chap. 5. of the hurting of the Touch) that he could never find that the Skin could be made stupid and senseless of pain by any external Narcotick applied thereunto, albeit (that so he might know somwhat of a certainty) he had applied a Mass of Opium when he had first softened it, unto the part pained with the Gout.

But the truth indeed is, that Narcoticks when they are administred do very easily assuage the pain; but then withal it being so that they hinder the motion of the humors unto the external parts, they may also very easily cause some inconvenience, and make the pain longer, since that the pain is wont to return again in a short time after. As for example.

Take *Barly Meal four ounces, the Crumb of Wheaten Bread three ounces, Milk as much as will suffice: boyl them to the consistence of a Cataplasm; and then add of the Oyl of Roses one ounce, the Yelks of three Eggs, Opium one scruple, and mingle them.* Or,

Take *the soft pith of white Bread as much as wil suffice; pour thereon of Cream of Tartar a sufficient quantity, and then add Saffron one dram, Frankincense half a dram, Powder of Earth-worms two drams, the Yelks of four Eggs, Henbane and white Poppy seed, of each three drams; let them boyl in a double Vessel for half an hour, and make a Cataplasm.* Or,

Take *Leaves of Henbane three handfuls, the Berries of Nightshade one ounce; let them be boyled til they be soft, and then bruised to a Mash; then strew upon it one ounce and half of Barly Meal, and a little Oyl of Roses, and so make a Cataplasm.* Or,

Take *Barly Meal, the soft Crumb of white Bread, of each half a handful; Leaves of Henbane, Mallows, Violets, of each one handful; Flowers of Camomile, Rindes of white Poppy, of each half a handful; Oyl of Earth-worms, and Poppy, of each one ounce, and make a Cataplasm.* If you think fit you may also add of *Opium* and *Saffron*, of each one dram.

Or, Take *Roots of Mandrake, and Leaves of Henbane of each as much as you think wil suffice; boyl and bruise them all to a Mash, and then add of Barly Meal, and Bean meal, with Oyl of Roses, a sufficient quantity of each, and make a Cataplasm.* Or,

Take *Crude Vitriol two pound, Spirit of Wine three pints, the Water of the Elder Tree one Quart.* Mingle them all well together in a Glass Vessel well Luted, and then puting to the Alembick, and the Receiver (in which there may be put the *Seeds of Henbane bruised two ounces, the flowers of Mullein, Elder, and Camomile, of each two handfuls*;) let there be a destillation, by degrees, until the Glass be Fire hot. After the distillation, let the spirit with the flegm be separated from the Seeds and flowers; and so let it be kept in a Glass for use. Or,

Take *Leaves of Henbane one handful, Nightshade, Sengreen, the Heads of Garden Poppyes, of each half a handful, Mandrake Roots one ounce, Flowers of Camomile and Mulleyn, of each one pugil, Seed of Fleabane one ounce and half, of Henbane one dram*: Let them be boyled in Milk for a Fomentation; then let the Remainders be bruised to a mash; and then add of the *Meal of Lin-seed one ounce, Barley Meal and Oyl of Roses, of each two ounces*; and make a Cataplasm.

And there are some also that refer hither the washing of the grieved part with cold Water; and indeed this they do by the authority of *Hippocrates*, who in his 5 *Sect.* 25. *Aphorism*, writeth in this manner: *The Gout pains of the Joynts, as also Convulsions, and many more of these kind of pains are lessened and taken away by the large affusion of cold Water, and plentiful pouring of it upon the part that is in pain: for a Moderate stupifying and benumming removeth the pain.* And so likewise *Donat. Antonius Ferrus* (in his 2 *Tract of the Gout, Chap.* 9.) writeth that he had oftentimes had experience of this Remedy; and that when all other Remedies were to no purpose, he betook himself unto the pouring of cold Water upon the part, as unto his last shift, and that the pain was forthwith asswaged thereby. And the very truth is, that it cannot indeed be at all denied, that cold Water being poured forth upon the pained part doth not only drive back, but likewise produce a kind of stupidity and benummedness, and thereby asswage the pain: but it is to be feared lest that by this means the innate heat of the part be destroyed, and so a weakness brought upon the part, by reason of which the Malady may afterward be rendred more grievous, and moreover the Humor may be impacted into the part, and there condensed and thickned; or else haply by this violent Repulse the Humors may be made to rush unto the more inward parts.

Repellers, or *Medicaments that drive back.*

Repellers. But now as for Topicks, (that are directed unto the Cause) and in the first place, touching Repelling Medicaments we say, that although they are by some commended; yet alone they have here scarcely any place at all. For seeing that Nature her self hath ordained this Motion, and that she endeavoureth to drive forth the vitious Humors from the more internal unto the external parts that are less noble, if this motion be hindered, and the Humors driven back again unto the internal and more noble and principal parts, this cannot be done without the extream hazard of the life; and hereupon there will arise the worst and most dangerous Symptoms, that will not cease, unless Nature again expel forth the vitious Humor unto some other Joynt.

And moreover, when the pain is a little mitigated, in regard that the matter is diffused unto the external parts that are about the Joynt, if by the Repellers it be driven back unto the internal parts, the pain happeneth then to be increased; and hence it is also, that very many cannot so much as endure the cold Air from without (neither yet sometimes the external Air although it be not so very cold) but that there is a Necessity of covering the affected Member, if they expect to have their pain Mitigated. And furthermore if the matter hath already flown out of the part into the Joynt, by the use of Medicaments that drive back and Cool it is made more thick and impacted into the part, and so the Malady rendred more difficult to be cured. But yet nevertheless if by the sudden and overgreat afflux of the humors (especially such as are more hot) the pain be much increased even in the very first beginning of the fit, (in so much that it seemeth to cal for all the Care, and to require that al the means that are used may be for the removal thereof, and that therefore we have a mind to moderate it, and somwhat to drive it back) we may then indeed make use of Repellers, but not of them alone and by themselves, but mingled with Anodynes, Venesection and Purgation having gone before. Like as on the Contrary, we

are

are not in the beginning to make use of those Medicaments that are over loosening, since that they help forward the afflux of the Humors; but we ought in the first place to make use of those Medicaments that do somwhat stop and stay the afflux of the Humors. And therefore we may then lawfully add *Lettice, Sengreen, Purslaine, Violets, Plantane, Roses,* (and such Compounds as are made out of them) as also what *Vinegar* we think fit. As,

Take *Barly Meal three ounces; boyl it in Oxycrate; then add the Yelks of two Eggs, Saffron one scruple,* and mingle them. Or,

Take *Mucillage of the Seed of Fleabane, extracted with Rose Water, two ounces; Mucillage of Marsh-Mallow Seeds one ounce, Barly Meal as much as will suffice, the yelk of one Egge, and so make a Cataplasm.* Or,

Take *The water of the Sperm of Frogs four ounces, Water of Nightshade, of the flowers of Elder, and of Plantane, of each two ounces; Camphire half a scruple:* and mingle them well together.

If you think fit, *the Mucillage of the Seed of Fleabane, and of Quinces, of each one ounce, may be added.* Or,

Take *Juyce of Henbane, Sengreen, Lettice, of each two ounces, Barly Meal one ounce, the Yelk of one Egg, and Oyl of Roses two ounces.* Mingle them well together. Or,

Take *Red Roses one handful, the Meal of Fenugreek Seed, Beans, and Barly, of each one ounce, Red Sanders one dram and half, Camomile flowers one pugil; when they are boyled and throughly bruised, you are to add the Yelks of two Eggs, Vinegar four ounces, Oyl of Roses as much as will suffice:* and make a Cataplasm. Or,

Take *Water of Night-shade, of Plantane, of the Sperm of Frogs, of each two ounces, Oyl of Roses and Camomile, of each one ounce, Cows Milk three ounces, the Meal of Beans, Marsh-Mallows, and Barly, of each one ounce, or as much as will suffice, Saffron one scruple, the yelks of two Eggs, Smallage two scruples;* Make a Cataplasm.

Some there are that steep *Harts-horn burnt and prepared in the Water of Mulleyn flowers;* or else they boyl it in the same Water; and in the streyning they wet and soak Linen Clothes, and these they lay upon the part that is pained. Or,

Take *Mulleyn new and fresh gathered six pound, Wine one Quart:* Let them be Macerated for three whole daies, and then afterwards let them be destilled. Or,

Take *The Flowers of Mulleyn, and fill a Glass bottle ful of them, and then stopping the mouth thereof very close, set it in the Sun: for so they dissolve as it were into a liquor: wherein you are to wet a Linen Cloath, and lay it upon the part affected, for the asswaging of the pain.*

If you judg it fitter to make use of Oyls; Then,

Take *Frogs five of them in Number, Earth-worms washed in Wine three ounces; boyl them in the Oyl of Roses, and strain them.*

Discussing Medicaments.

Discussives.

But now when the force and violence of the fluxion is once past and gone, and the part become swoln, then those things are withall to be mingled which do cal forth the Humor, and gently discuss the same and so take away some part of the Cause. But now here Physitians are wont (for the most part of them) to be very long and Tedious in reckoning up, and distinguishing the several Medicaments; which of them are fit and proper in a hot Cause, and which of them when the Cause is cold; yea and which of them are most convenient for all kind of Humors. But although we deny not but that we are in some kind of manner to have respect unto the Condition of the Humor that floweth in unto the Joynts; yet nevertheless our chief and main Care ought to be, that the serous and sharp wheyish Humor (which is the nighest and most principal Cause of the pain,) may be called forth of the more deep and close parts in the Joynts unto the external parts, and that they be insensibly discussed; and yet that this may the more conveniently be so done, we may likewise (as we said but now) have some regard unto those Humors that the aforesaid serous and sharp Humor forcibly draweth along with it, and which by Reason of the pain are together attracted to the part that is pained, and which are very commonly taken for the nighest and most immediate Cause of the Gout. Yea and

moreover that very ſerous Humor it ſelf (the prime and principal Cauſe of this Evil) is in ſome more, and in others leſs hot. And therefore if the flowing Humor be more hot, then the diſcuſſing Medicaments ought to be ſo ordered, that they may indeed gently diſperſe the Humor; but yet ſo that they give no occaſion at all for any new afflux. And ſuch a like hot Humor, inregard that it is withall moveable and thin, is eaſily diſcuſſed; neither needeth it any ſtronger Medicaments. But if the Humor be leſs hot, or ſomwhat cold, then we may very ſafely adminiſter Medicaments that are more hot. Neither will there be any Cauſe to fear that then a new flux may eaſily be excited; and therefore for the diſperſing of ſuch a like Humor there are neceſſarily required ſuch Medicaments as are more hot then ordinary.

But now with what Medicaments that wheyiſh, and (as it is ſo called by the Chymiſts) Tartarous Humore is to be drawn forth and diſcuſſed, we are here (and that for very good Reaſon) diligently to make inquiry. For we have elſwhere told you (viz. in our Tract of *Chymic. Conſil. & Diſſ. Chap.* 15.) that the Medicaments ought in their own kind to be like unto the Cauſe. For there is not any thing that ſuffereth from every thing; neither is there any thing that may be united unto every thing. Gum Arabick, and Tragacanth, and the Gum of Cherry Trees are diſſolved by Water, becauſe of the neer alliance and agreement in their Natures; but but ſo is not Sulphur, and other things of a Sulphurous Nature, and thoſe things that are Oyly. Sulphur is diſſolved by Oyl, but not by *Aqua Fortis*, although the ſaid Water is able to diſſolve ſilver, and other Metals. The hands when they are all foul with Pitch or Turpentine are not to be made clean with Water, but with Oyl, or ſome thing elſe that is fat. In burnings we uſe not to adminiſter cold Water; but Linſeed Oyl, Verniſh, and the like (that may draw forth that fire and burning) are to be applied. And ſo in the *Eryſipelas* (or otherwiſe called *Roſa*) we ought not to impoſe thoſe things that are fat, and Oyly, but ley tempered with Oyl; and Sope that is diſſolved in Elder Water, and the Like; which do not at al ſhut the pores, but yet nevertheleſs they draw forth and diſcuſs that ſubtile and hot Humor. And the very ſame is the caſe in the Gout; and ſince that it hath its Original, not from a Watery Humor, neither yet alſo from that which is Oyly or Sulphurous (as the Chymiſts ſpeak) but from a Humor that is ſharp and Salt, for the drawing forth and diſſipating of this Humor, thoſe things that contain in them a volatile and flitting Salt are rather to be adminiſtred, then thoſe things that are fat and Oyly. And experience hath already taught many, that the Gout pains are increaſed by ſuch things as are fat. And hence it is that the Chymiſts do ſo much commend (and not without cauſe) *Salt Armoniack*, oftentimes ſublimated, diſſolved in Wine, or ſome other convenient liquor, and ſo impoſed upon the pained part. Others commend the Salt of Urine, in like manner diſſolved in Wine, or ſome other liquor. And whereas *Adrian Spigelius* writeth that he ſaw when a Mans Urine (being kept till it was Stale) was laid upon the part affected (the pains as yet abiding, and continuing even in their heighth) and that it was wonderfully beneficiall in giving eaſe; and how much rather then muſt the Salt of Urine perform this? Yea and there are ſome that uſe likewiſe other Salts to evacuate the aforeſaid Humor. And I my ſelf know alſo one that was wont to adminiſter the ſpirit of Salt tempered with other liquors, And very fitly may it be tempered with the *Water* of *Meadowſweet*; for being then with a Feather laid upon the part in pain, it extracteth the Humor in ſuch a manner, as that it may even ſeem to exhale in the likeneſs of a Vapor. Yea ſome there are that commend alſo thoſe things that are wont to be made uſe of for the cauſing of redneſs in any part, and the raiſing of bliſters when there is occaſion; and theſe they mingle with *Anodynes*. Neither are theſe things the inventions of the latter Phyſitians, and the Modern Chymiſts; but that plants abounding with a volatile and ſharp Salt were heretofore in uſe likewiſe with the Ancients, for the curing of the Gout, we are taught even by that one plant which we call *Lepidium* or *Sciatica Creſſes*; whoſe Roots (as they write) being bruiſed, and mingled with old Greaſe, are (with ſingular benefit) applied unto thoſe that are troubled with theſe pains of the Gout; as it appeareth out of *Dioſcorides*, and *Damocrates* (whoſe verſes upon this ſubject we may read in *Galen* his 10. *B. of the Compoſition of Medicaments according to the place*) and *Aetius*, *Tetrab.* 3. *Serm.* 4. *Ch.* 2. and others. And as touching Muſtard Seed, *Alexand. Tralleanus* writeth,

writeth, That he knew a certain person who by the use only of the said Mustard seed mingled with dried Figs (in extraordinary great pains arising from a cold Humor) was freed from the said pain of the Gout. Some commend the wild Radish throughly bruised; and I my self have seen that it hath done good to many. If we fear its Acrimony, and that from thence some heat may be excited, we may then first boyl it a little.

The Liquor of Snails is likewise very much extolled by some: as,

Take *Snails taken forth of their Shels, in number twenty five: the berries of Danewort or Dwarf-Elder, and Salt, of each as much as will suffice.* These being put into the Alembick in a clean Vessel with holes through the bottom thereof, let there be a Vessel put under it that may receive the Liquor as it distilleth; in the which you are to wet cloaths, and apply them unto the part affected.

This Suffumigation is likewise much commended.

Take *Lign. Aloes, yellow Amber, Frankincense, Gum Juniper, Henbane seed, Styrax Calamite, Gum Tacamahaca, of each one dram*; Pouder them grosly, and cast the pouder upon live coals of fire; and so for half an hour let the part affected receive the smoak hereof. *Quercetan* (in the seventh Chapter of his *Pharmacop. restit.*) hath four Waters, al good against the Gout. The first is this:

Take *Water of the Sperm of Frogs, of white Mullein, and Sallow, of each a quart and half a pint: the Urine of a Boy that drinketh Wine, three pints: Treacle new and fresh two drams and half: Vitriol, Salt dissolved, and Allum, of each four ounces: Let them be distilled (till they be dry) upon the Embers: then add Salt of Vitriol one ounce and half: Camphire and Saffron, of each two drams, and mingle them.* Let Linen cloaths be throughly wet in this Water, and applied unto the grieved part, and be very often renewed.

The Second Water is this:

Take *Salt, Urine of a Child, of each as much as you think fit, and then distil them.*

The third is this,

Take *Leaves and Flowers of green Elder, of each one pound: let them be well bruised and macerated in a sufficient quantity of Wine (for three daies together) in* Balneo, *and afterward let them be distilled.*

The fourth Water is this:

Take *Spirit of Wine rectified one quart; the purest Honey one pound:* Let *them be distilled in* Balneo; *and let two Liquors be gathered from hence severally and apart, to wit, One watery, and the other Sulphureous. Add unto the remainders, of whol Saffron one ounce and half; Venice Turpentine two ounces; Tartar calcined to a whiteness half a pound; Salt one ounce; the flegm of Vitriol four ounces; Lye made of the tender shoots of the Vine two pints: Let them be macerated for twenty four hours, and then distilled till they be dry. Unto the feces that remain add the first Water, and let them be distilled. And at length mingle together all the Liquors, and distil them in a* Balneum *where they may evaporate.*

Andreas Libavius (in the first part of his *Apocalyps. Hermet. Cap.* 8.) preferreth before all others that Water in which Brass and Iron have been extinguished, and afterwards *Mercurius vitæ* hath therein been macerated. Or,

Take *venice Soap one ounce and half; Spirit of Wine, Water of Elder Flowers, of each two ounces, and mingle them.* Or,

Take *River Crevishes eight in number; Juniper grains one handful; Myrrh and Frankincense, of each one ounce; the best Wine one pint, let them be distilled.* Or,

Take *Mastick, Frankincense, Myrrh, Ammoniacum, and Bdellium, of each two ounces; Vitriol one pound; Honey a quart, Tartar an ounce and half; Spirit of Wine the best, four pints; let them be distilled according to art.*

Solenander (in his 24. *Consil. Sect.* 5.) writeth, That he knew an old man that was much troubled with the Gout, who made for himself a Medicine in this manner. When there was a swelling, and a real pain, and the place red, he took Salt, Cinders, the Urine of a Child, and Vinegar; in these (wel mingled together, and stirred up and down) he throughly moistened a white woollen cloth, and then squeezing it he applied it now and then unto the part that was pained. And when he had now by this means in great part asswaged the pain, and the disease declining, he boyled live Sulphur, and the pouder of white Hellebore in the Oyl of Linseed, and with it he anointed the places affected. And the same *Solenander* writeth also that this following was known to benefit many that made trial thereof. There groweth unto the Roots of the Oak (in the Autumn for the most part) a certain kind

kind of Mushrom that is red and tender, and proportionably big enough, according to the growth of the Tree, which he therefore calleth *Hypodrion* (the same no doubt that we have made mention of above in our 3. *B.* of *Practice*, *Part.* 2. *Sect.* 2. *Chap.* 7. touching the *Dysentery*:) this when he hath cut it into many smal thin slices, with Salt finely poudered he puts it into an Earthen pot; so sprinkling the aforesaid Salt that every laying of the several pieces may receive some thereof betwixt each other: he then puts them deep in the Earth for certain daies; and as for the brine which at length he findeth melted in the pot, he gathereth it all together, and this he keepeth to anoint the joynts when they are pained. But because that it vehemently drieth and discusseth, and wonderfully strengtheneth the part that is made loose by the Humor, he tels us therefore, that it is best to use it in the very first beginning of the pain, and before it hath gotten unto any heighth; or else in the end and declining of the Paroxysm, to consume the matter, and to add strength and firmness unto the part; and more especially if there be now and then interposed a fomentation and washing of the parts with the Decoction of *Mulleyn*, *Wormwood*, *Camomile*, *Bears-ears or French Cowslips*, *Sage*, *Ground-pine or Herb Ivy*, *Mugwort*, *Rosemary*, *Melilot*, and others of this kind, that have a power to cut, cleanse, discuss, meanly to dry, and strengthen.

And this Plaister is likewise very much commended.

Take *Gum Caranna one ounce and half*, *Gum Tacamahaca six drams*, *the Oxycroccum Emplaster*, *nine ounces*, *White Wax five drams*, *Powder of the greater Confound two drams*. *With the Oyl of Camomile make an Emplaster according to Art*; *which being applied unto the pained part doth greatly draw forth the matter*, *and ease the pain.*

And of such Kind of Medicaments as these there are many more in great abundance to be found in *Platerus* his second Book of Practice, and elswhere in others.

And yet notwithstanding I think it not amiss, here to give you notice of this, that in the applying of all manner of Topicks we are diligently to heed the signs of those that benefit, and those that hurt and offend. For albeit the nigheſt Cause of the Gout be a wheyish, salt, and tartarous humor (or cal it by what name soever you please) yet nevertheless it is not for nothing that the Chymists give us notice (as we shal further shew you below in the *sixth Question*) that there are in the Earth and Plants divers kinds of Salts; or as *Platerus* speaketh, that the humor the Cause of the Gout is mingled with the *Ichores* of the excrementitious humors, which render the same more vehement and violent. And hence it is, that not only in divers and several Persons, but likewise in one and the same Person, according to his several ages, the nature of the pain is different, and not evermore one and the same.

And then laſtly, for the discussing of the Reliques and Remainders there may be made fomentations of Mugwort, Organy, Wormwood, Betony, Calamint, Flowers of Arabian Stœchas, Lavender, Camomile, Melilote, boyled in Wine and Water, which withal strengthen the part. But here *Crato* doth rightly advise us (in his *Consil.* 240) that we wet the Feet as little as may be, but that the vapor be only received by the Feet. And indeed such like fomentations are most convenient. And yet notwithstanding if there be a few more Plants boyled in the Water, and a little salt added; or else if a *Lixivium*, or Ley, be poured thereunto, there is no discommodity to be expected from the humectation; or if we do at all fear any hurt, left that the wateriſh humidity should after the bath be left in the part affected, the following Trochisks may be cast upon the Coals of Fire, and the smoak received by the part affected.

Take *Gum Juniper*, *and Frankincense*, *of each two drams*; *Ladanum and Benzoin*, *of each one ounce*; *Cinnamom*, *Cloves*, *and Nutmeg*, *of each half a dram*; *make them into a Powder*, *and incorporate them with Gum Tragacanth*; *and then make Trochisks thereof.*

There is likewise very much commended a Bath of Juniper Wood, as also of the Decoction of a whol Fox, adding thereto Frogs and Earth-worms, and the Herbs before recited.

Or else let the Feet be anoynted with some convenient Liniment or Unguent. *Galen* (in his 2. *B.* of simple Medic. Chap. 18.) as likewise many other Authors, do much commend the Chafing and Rubbing of salted Oyl into the part affected. For in all those (saith *Aetius tetrab.* 3. *serm.* 4. *Cap.* 21.) that are chafed in this manner, the Natural innate heat is augmented, that which is preternatural is dispersed, the Excrements are consumed, and the affected Members are rendred more strong, so that they are no further obnoxious and subject unto pains; especially, if from day to day all their whol life long they be diligent in the use

uſe of this Remedy every morning and evening. Touching which *Philagrius* very confidently (and without doubt Hyperbolically) is bold to pronounce (as *Aetius* writeth in the place alleadged) that even this one Remedy alone is ſufficient for them that either moſt of all tranſgreſs in matter of Dyet, or ſuch as are immoderately cooled, or ſick with over hard labor, or ſuch as have been exceſſive in the uſe of Venery, or ſuch laſtly as have run into any other error and exceſs. But now becauſe that the Oyl and Salt are not eaſily mingled, the Salt is firſt of all to be moiſtened in hot Wine, and afterward in a Mortar to be diligently mingled with the Oyl; and alwaies before this Liniment be put unto uſe, the Salt is throughly to be mingled with the Oyl. Neither is it ſufficient only to anoynt, but the Joynts are alſo to be wel rubbed, that ſo the force and virtue of the Medicament may the better penetrate.

Take *Caſtor and Frankincenſe of each one dram and half, Marrow of a Hart, the Fat of a Gooſe, of each three drams: Oyl of Maſtich and Mints, of each two ounces and half: Bdellium and Galbanum diſſolved in Vinegar, of each half an ounce: the meal of Linſeed, and Fenugreek, of each three drams and half: Wax as much as will ſuffice, and make a Cataplaſm.*

The Remedy of *Flavius Clemens* (by the uſe of which, as it is reported, men that have been deſtroyed in their whol body by the Gout *Podagra* and *Chiragra*, have been ſo well recovered that they have walked without any hurt or hinderance) is deſcribed by *Galen* in his 7. *B. of the Compoſit. of Medicam. according to their kind, Chapt.* 12. (where he hath alſo other Receipts of this Nature) and ſo likewiſe in his 10. *B. of the Compoſit. of Medicaments according to the place, Chap.* 2. Or,

Take *Gum of the Pine Tree one ounce, black Pitch two ounces, Wax one ounce and half: the fat of an old Cock two ounces, pouder of Hermodactyls, and live Sulphur, of each three ounces: Let there be an Emplaſter made thereof, and renewed the third day.*

Theſe Remedies immediately following are preſcribed by *Henricus Stapedius* (in *Conſil. Scholtzii, Conſil.* 238.)

Take *Juniper berries, and Marſh-mallows, of each two ounces: the Leaves of Lawrel, Myrtil, Sage,* Betony, *Caſſidony, or French Lavender, Organy, Calaminth, Marjoram, and Roſemary, of each of theſe half a handful: Linſeed and Fenugreek, of each two ounces: Make a Decoction in the Lye of the tender ſhoots of the Vine, adding thereto of common Salt one pound.*

Afterward let them be anointed with the following Oyl.

Take *Roots of Pellitory, Nutmeg, and Cloves bruiſed, of each two drams; Flowers of Sage, Hyſſop, Roſemary, Arabian Lavender or Caſſidony, and Spicknard, of each one dram and half; the Root of* Birthwort, *and Hermodactyls, of each one ounce: pour in hereunto of the Spirit of Wine one pint, or as much as wil ſuffice; let them be macerated for one whol day; and afterwards add of the beſt Turpentine one pound and half; and ſo diſtil them in a glaſs Alembick.*

Alexander Trallianus and others commend this; and they aſſure us that by it not only ſuch as have had the Gout from the flowing of a flegmatick Humor, but that likewiſe many that have had the pains of the Gout from the flux of a Colerick humor, have recovered their health and ſtrength again.

Take *Time, Organy, Savory, and Calaminth, of each as much as you think fit; and boyl them in the ſharpeſt Vinegar; and with the hot Decoction often waſh and foment the parts affected.*

For the Knobs or Knots.

For the Knots in the Joynts

If the matter be now grown into the wonted hard Knobs, it is indeed a moſt difficult buſineſs to diſſolve them; but if they be not already become old and inveterate, there may be yet ſome hopes left of curing them. Now for the diſcuſſing of theſe knobs and knots we are not only to adminiſter External and Topick Remedies, but likewiſe Internal Remedies. The Internal Remedies are thoſe Antidotes above mentioned, amongſt which the Antidote of *Trallianus* (made of Centaury) is more eſpecially uſeful. And the ſame *Trallianus* writeth likewiſe, That a certain perſon troubled with the Gout, when the knots began firſt to appear, by the drinking of the Decoction of Groundpine or Herb Ivy, he prevented the further generating of them. External and Topick Remedies (uſeful for the diſſolving of the Knobs) are *Ammoniacum* diſſolved in Vinegar. Or,

Take *the ſimple Diachylon Emplaſter one ounce; Ammoniacum, Galbanum, Bdellium, Sagapenum,*

Sagapenum, of each one dram, Oyl of Orrace, and white Lilyes, of each half an ounce, powder of Orrace one dram, and make an Emplaſter. Or,

Take *Briony Roots, Wilde Cowcumber, and Orrace Roots, of each two ounces, Roots of Marſh-Mallows, and white lilies, roaſted under the hot Embers, of each four in number; the Seed of Nettle, Muſtard, and Water Creſſes, of each one ounce.* Let them all be wel mingled, and ſtird about together with *Gooſe Fat,* and the *Oyl of ſweet Almonds,* as much as will ſuffice, and make a Cataplaſm.

Galen and others do much commend that which is made of old Cheeſe: for the Skin being broken and divided of its own accord, without any Section, it refreſheth and comforteth the Joynts that are from day to day (without any hurt at all) freed from the Stones. *Viz.*

Take *Old and tart Cheeſe, three ounces, or as much as you think fit; dip it in a ſufficient quantity of the broth of Salt ſwines fleſh, and then after you have ſufficiently pounded it in a Mortar, let it be impoſed upon the part affected. Others boyl the Salt Feet of Swine in water, until they be very ſoft and tender, and afterwards they mingle with them of old Cheeſe two parts, and Water Creſſes one part, and ſo they make an Emplaſter, which they greatly commend.* Or,

Take *Juyce of Tobacco three ounces, Citrine Wax two ounces; Roſin of the Pine Tree one ounce and half, Turpentine one ounce, Oyl of Camomile as much as wil ſuffice:* and make a ſoft Cerote. Or,

Take *Honey, Bears Greaſe, and ſharp Vinegar, of each one pound or pinte, Mountain Snakes, and Snailes, one or two of them; boyl them in a Glazed Veſſel over a ſoft fire, until the Vinegar be conſumed; afterwards ſtrein them, and add of Wax three ounces.* Let them then beal diſſolved together, and kept for uſe; and with this the place affected is to be anointed, by the fire ſide.

The Dirt that is found in ſome certain Baths (having in them a power to Mollifie and Reſolve) are here likewiſe very uſeful; (ſuch as are thoſe of *St. Peter,* and *Bartholomew,* in the province of *Padua*) with which the part affected is to be fomented for an hour, and better, every Morning and Evening, and afterwards to be waſhed with the Bath-Water.

Eraſiſtratus Sicyonius provided this excellent and effectual Remedy againſt theſe knobs and knots.

Take *Oake Miſsletoe, one pound and half, Frankincenſe, Wax, Fat Torches, and Roſin of the Pine Tree, of each one pound.* Thoſe things that were diſſolveable he melted, and ſtird them wel about, throughly mingling them with the Fat Torches; from the which when all the Fat was flown forth, he took the Liquor from the fire, and ſtrained it, and then beating the Frankincenſe into a very fine powder he put it thereunto; dayly ſtirring it about, until he had brought it into a Maſs that would not foul, or ſtick to his Hands. See more of this in *Trallianus* his *Eleventh B.*

Chap. 6. *Of the Sciatick Pain.*

The Sciatick Pain.

THe pain of the Hips (commonly called the *Sciatica*) in indeed a kinde of the Gout; ſo that there may nothing ſeem needful to be ſpoken as touching it, beſides what hath been already ſaid. But ſeeing that both in regard of the part affected it hath ſomthing peculiar, and that in the Cure there is ſomething that is proper thereunto to be obſerved; we ſhall therefore ſpeak a little further thereof.

There are indeed ſome, who by the *Iſchiadick* or *Sciatica* pain underſtand ſome other affect, differing from the Gout, (which is to be accounted among the Chronical affects) and this happeneth alſo unto thoſe that never were troubled with the Gout, either in the Feet, or in the hands, from excrements there heaped up together, or flowing into that part, and this for the moſt part a little now and then, and by degrees. But it is not our purpoſe here to treat of that affect; in regard that it pertaineth unto the impotency and inability in walking, by reaſon of ſomething amiſs in the Hip; (and extendeth it ſelf further then the Gout; of which only our purpoſe is here to Treat;) and therefore we ſhall here handle the *Sciatica* pain,

only

only as it is Arthritick, that is to say, a ſpecies or kind of the Gout, of which we have been hitherto ſpeaking.

But now as touching the place affected, there is here ſome kind of Diſagreement among the learned Phyſitians. *Aetius* (*Tetrab.* 3. *Serm.* 4. *Chap.* 1.) out of *Archigenes* writeth thus: *They are properly* (*ſaith he*) *to be accounted Iſchiadick or Sciatick perſons, that have a pain afflicting them about ſome certain Joynt of the vertebræ. But ſomtimes there goeth before this Malady,* (*and as it were, to Uſher it in*) *a pain of the Muſcles lying neer, and eſpecially the Loyns; but ſomtimes again the beginning of the affect is from the very Joynt it ſelf: but now ſomtimes it ſo happeneth that the pain of the Vertebræ being almoſt taken away, the grief ſticketh only about the Ham, and in ſome neer unto the Ankles, but in others the whole Leg is equally afflicted with pain; and many alſo have this pain fixed about their Groyns, and then indeed the grief and trouble being derived unto the very bladder produceth a difficulty of making Water; and then moſt eſpecially it is that the whole Leg, from the Hips* (*even unto the very Heel*) *ſuffereth Pain.*

Fernelius (in his *Sixth B. of the Diſeaſ. of the parts, and the Symptoms, Chap.* 18.) ſaith, *that the Iſchias or Sciatick pain* (*being abſolutely the moſt vehement of all the reſt*) *hath not its ſeat in that Joynt by which the head of the Thigh is inſerted and faſtened into the Hip, but deeper, at the utmoſt of the Buttocks, by which the Nerves that proceed from the Loyns and the great bone, called Os Sacrum, or the holy bone, are carried into the Thighs; the great and terrible pain is not in the Hip alone, but it is likewiſe extended into the Thigh, and into the Calve of the Leg, and unto the extream part of the Foot, to wit, whitherſoever that branch that is derived from the Hip affected reacheth and extendeth it ſelf.* But ſome other, (as *Platerus*) attribute the Sciatick pain unto the Joynt, with the Thigh.

But here we are to underſtand, that about the Hip (as alſo now and then in the ſhoulder) there happeneth ſomtimes a pain, which is indeed very often moſt vehement, and yet nevertheleſs it is not properly a pain of the Joynts, in regard that it is not in any Joynt, becauſe it ſeizeth upon the Membrane of the Muſcles; neither again doth it conſiſt alwaies in one and the ſame place, but for the moſt part deſcendeth downward unto the inferior parts. And ſuch almoſt is that Iſchiadick pain that *Aetius* hath deſcribed out of *Archigenes*. And I grant that this pain hath its original from the Serous and ſharp Humor that floweth from the Head under the Skin, and ſticking about ſome Membrane, or ſome Nerve: but now, that this pain is not properly the Gout, appeareth from hence; Firſt, becauſe it conſiſteth not alwaies about the Joynts, but alſo in the middle ſpaces within the Joynts. And ſo I have here Cured a perſon of honor, that ſuffered ſuch a pain in the very Muſcles themſelves that are between the Knees and the Hip. And the like pains often happen in the Breaſt, and there excite a certain baſtard Pleuriſie. And then Secondly, becauſe that they very rarely return by intervals, and conſtantly at ſome certain times; but often after they have afflicted a man once or twice, they return no more afterwards all the whole life long. Thirdly, becauſe thoſe that ſuffer theſe pains are not afflicted with the Gout in any other parts, which happeneth in the true Gout, and that is properly ſo called. For thoſe that are long troubled with the Gout are very ſeldom afflicted with the Gout in the Feet alone; but they afterwards ſuffer pains likewiſe in their Hands, and their other Joynts.

And Laſtly, likewiſe the true Gout (for the moſt part, if not alwaies) hath a Tumor or ſwelling Joyned with it; but now theſe pains have no ſuch ſwelling Joyned with them; not only when they are in a deep place, but alſo when they are in a place that is not deep; as it often happeneth in the ſhoulder; and this cometh to paſs for this Cauſe, to wit, that the Humor floweth not out of thoſe Veins by which that part is nouriſhed, as in the true Gout.

But we intend not here to treat of that pain, but only of that which is properly the Arthritick or Gout pain. But now that *Iſchiadick* or *Sciatick* pain hath this proper unto it, that it is diffuſed more abroad then in the other Joynts, and oftentimes unto the places that lie next: and this happeneth, firſt of all, becauſe that the Hip bone is large; from whence it is, that we diſtinguiſh it by three names; and when it is knit unto the ſides of the *Os Sacrum*, we then cal it the *Ileum* bone; when unto the hollow part of the ſaid bone, we then call it *Iſchium*; and when it is Joyned with the forepart, we then call it *Os Pubis* or the ſhare bone. And then Se-

condly, becauſe that the Nerves that come from the Loyns and the *Os Sacrum* to that Articulation, are diſtributed into divers parts: and therefore the pain of the Hip doth ſomtimes diffuſe it ſelf into all places, and reacheth even unto the Nerves that are derived from the Hip.

But now this Malady is very difficult to be cured, by Reaſon of the deepneſs and largneſs of the place, and the abundance of the matter which the wide Place receiveth. *They who being infeſted by a long continued pain of their Hips have the Hip-bone fallen out of its place, and again returning into its place, theſe have a filthineſs and naſtineſs following thereupon*; (*in the ſixth Section, and* 59. *Aphoriſm.*) For if by the Humor flowing in the Ligaments be relaxed, the Hip falleth out of its place; and the Humor that is gotten into its Cavity is made dul and thick; yea and oftentimes it groweth there into a ſtony hardneſs; whereupon becauſe the Veins and Arteries are moved out of their proper places, and are preſſed down together, thence it is that an Atrophy followeth in the Legs. And if this Iſchiadick pain invade any one in the time of youth, it threateneth the ſhortning of the life, becauſe that by pain and hunger the ſick perſon waſteth and withereth away; and from hence likewiſe the *Iſchiadick Conſumption* hath taken its Name.

As concerning the Cure, for Revulſion, the *Baſilick* Vein in the ſame ſide is moſt fitly opened; but the *Iſchiadick*, if it be for derivation. And indeed if the pain extend it ſelf more externally, that Vein that is in the outward Ankle; or the *Saphena*, which is at the inward Ankle, if the pain tend more inwardly.

And *Hippocrates* likewiſe (6. *Epid. Sect.* 5. *Text* 21.) writeth, that *when there are Kedmata preſent* (by which *Galen* and others underſtand the fluxions into the Hip) *then the Veins behind the Ears are to be ſcarifyed.* But yet theſe think not that this precept of *Hippocrates* is true, or that it ought to be followed. But yet nevertheleſs *Scegghius* defendeth *Hippocrates*; and thinks that he did upon very good ground propound that which without doubt he had obſerved by experience. For ſeeing that the Cauſe of the evil diſtilleth into the Hip by the hole of the Nook, (or *Fernelius* his way) for the taking away the very Fountain and ſource of the Malady, he rightly determineth that the Remedy muſt be adminiſtred about the Ears. But if all this ſhould be granted, yet nevertheleſs thoſe *Kedmata* are not the *Iſchiadick pains* properly ſo called (which belong unto the Gout) but thoſe of which we made mention before.

The ſtronger kind of Purgations have here their place; and here the *Caryocoſtina Electuary* is of ſingular uſe, as alſo the *Arthritick Pills*, *Pill. Fœtidæ*, and the *Pills* of *Hermodactyls*. *Crato* indeed (in his 247. *Conſil.*) writeth that the *Iſchiadick or Sciatick* pains will not admit of, nor bear purges; in regard that the Humors have ſeated themſelves more in thoſe places: but this is to be underſtood of an inſufficient Purgation.

And here Vomitories ſeem to be more commodious then Purgers by the Belly, in regard that they evacuate the vitious Humors by a place more remote from the part affected.

But Repellers have here no place at al, becauſe that it may Juſtly be feared, leſt by the uſe of theſe the blood and other Humors may be driven back toward the part affected, and may be there heaped up.

Having firſt made uſe of General and Univerſal Remedies, we come then to the impoſing of Medicaments that attract and reſolve, and theſe ought to be of the ſtronger ſort, that they may call forth into the Superficies the Humor that is gotten into a deep place; which kind of Medicaments are provided of Herbs that diſcuſs, *viz. The Leaves of Eldern, Danewort or Wallwort, Lawrell, Rue, Betony, Camomil, Ground pine, Roſemary, Melilote, Muſtard Seed, and Staveſacre; as alſo the flies Cantharides, Pitch, Sulphur, Turpentine, Ammoniacum, Galbanum, Bdellium, Opopanax, and Euphorbium.*

Excellent likewiſe is that Medicament that is made of *Sciatica Creſſes* (of which we made mention above,) as alſo of *Water Creſſes*, and the Herb *Piperites*, or *Pepper-wort*, as ſome call it. As,

Take *Sciatica Creſſes, Dittander or Pepperwort, and Water Creſſes, of all, or one of them four handfuls: boyl them in Wine, and ſprinkle upon them the Meal of Lupines, Beans, and the bitter Vetch Orobus of each one ounce, the powder of dry Rue two drams,*

Flowers

Flowers of Camomile one dram, Coſtus Root a dram and half, Oyl of Turpentine half an ounce, Oyl of Earth-worms as much as will ſuffice, and make a Cataplaſm. Or,

Take *Muſtard ſeed diſſolved in the ſharpeſt Vinegar two ounces, ſharp and ſowr Leaven half an ounce, Powder of Hermodactyls two drams, Honey three ounces, Turpentine four ounces, Oyl of Lawrel and Spike, of each two ounces, the meal of Fenugreek ſeed one ounce and half; Earth of the Ant-hill with the Ants Eggs, one pound; Leaves of Lawrel, Sage, Rue, and Roſemary, of each half a handful; Earth-worms prepared half a pound: let the Ants Earth and Eggs, with the Earth-worms and Herbs, be boyled in white Wine, and then being ſtrained let the reſt of the Ingredients be mingled therewith.* Or,

Take *Roots of our Ladies ſeal (which being cut and applied to the Hip are much commended for the removing of the Iſchiadick pain) ſix drams, the Emplaſter* Diachylon ſimplex *half an ounce; Saffron diſſolved in the Spirit of Wine two drams, Turpentine one ounce, Oyl of Spike as much as is ſufficient; and make a Cataplaſm.* Or,

Take *Citrine Wax, and Turpentine of the Fir Tree, of each three ounces; let them diſſolve together: when they ſhal be cold ad the Powder of Nettle ſeed, and Hermodactyls, of each two drams; Roots of round Ariſtolochy or Birthwort, Camomile Flowers, and Florentine Flower-de-luce, of each two drams and half; Mirh two drams, Saffron four ſcruples: let them be moulded with the hands being firſt anoynted with Hogs Greaſe, and make an Emplaſter.* Or,

Take *Wax, Miſſletoe of the Oak, Turpentine, dry Orrace, Mirrh, and Galbanum and with the Oyl of Earth-worms make a Ceroſ.*

Unto which if the pain give not place, but ſtil continue, then apply Cupping-glaſſes with much flame, or elſe Veſicatories.

But if the Malady wil not yet by theſe be taken away, then we are according to the counſel of *Hippocrates* (in the ſixth Sect. of his Aphor. *Aphor.* 60.) to burn the part affected; and *Celſus* likewiſe approveth of this advice, whileſt (in his 4. B. and Chap. 12.) he writeth in this manner:

It is (ſaith he) *the laſt ſhift, and in old diſeaſes alſo a moſt efficacious Remedy, with glowing hot Irons to exulcerate the Skin in three or four places above the Hip.*

This Remedy by heating the part diſſolveth and evacuateth the thick and viſcid humors; and if the Ulcers be kept open (as they ought to be) the vitious matter floweth forth by them. As for the manner of burning, ſee more in *Paul. Ægineta* his ſixth Book, and Chap. 76. and *Albucaſ.* Part 1. Chap. 43.

And ſome there are likewiſe that make mention of the Gout of the Vertebræ of the Back, in ſpecial: and we grant indeed that now and then ſome ſuch kind of Gout there is; and this hath alſo the very ſame Cauſes and ſo requireth the ſame kind of Cure with the other Gouts. But we are here to look wel about us, and to have a care that we be not deceived, in miſtaking every pain of the Back for the Gout. For oftentimes it ſo happeneth that from the ſerous and wheyiſh matter flowing down from the Head, and deſcending along the Back, and eſpecially according to the Conveyance of the Cucullar Muſcle (and ſticking at the *Spina Dorſi*, in the end of the ſaid Muſcle) a pain may be excited; which yet nevertheleſs is not the Gout, in regard that it happeneth not in the parts pertaining to the Joynt; and it is oftentimes likewiſe of a very ſhort continuance, and afflicteth the ſick Perſons in their ſleep, but when they awake, and ariſe from their ſleep, it leaveth them and vaniſheth, which never happeneth in the true Gout.

Chap. 7 *Of the VVay and Means to prevent the Gout.*

The way to prevent the Gout.

MAny there are that mind only this one thing, to wit, that they may be freed from the preſent pains of the Gout; but being freed they take no care at all, how they may obtain that they be no more troubled with the ſame pains; neither do they make uſe of thoſe Medicaments by which they might prevent this Evil, nor at all refrain from the Errors of their Dyet; and ſo they ſuffer the Malady again to ariſe, and ſo to continue and grow old with them; and therefore it is no wonder, that there are ſo few perfectly recovered of the Gout. But a precaution, and prevention, is altogether as neceſſary as the Cure in ſpecial ſo called.

In what things it consisteth. Now this Consisteth in three things: The first is this, that there be care taken that there be no matter suffered to gather together which may flow unto the Joynts. The second, that if any matter be gotten together, it be taken away before it rush unto the Joynts. And the third is this, that the Joynts may not easily receive the same. Now if (as many do) any one shal make it his business only to strengthen the Joynts, and in the mean time shal permit the heaping up of the vitious matter in the Body; the Patient shal hence reap more hurt than good. For if there shal be a vitious Matter present in the Body, and this not thrust forth unto the Joynts, after the usual and accustomed manner, being retained in the Body it may flow unto other of the more noble parts, and be the Cause of most grievous Diseases.

And therefore we are here first of all to commend unto the Patient a good course of Dyet, and Medicaments that correct the distemper of the Bowels; the first intention being best performed by this. The second thing required is accomplished by Blood-letting, Purgings, and other things that take away the serous and Tartarous humors. The third, by those Medicaments that strengthen the Joynts.

The first member of prevention is the Dyet And first of all, As touching the Dyet, this is absolutely necessary, and may do much in the prevention of the Gout; and indeed it is of so great consequence, that without it the Medicaments (let them be never so excellent) wil nothing avail. And that so few are cured of the Gout, this for the most part happeneth by reason of the too great liberty and licence they take in point of Dyet. And on the contrary, a due course of Dyet hath been known it self alone oftentimes to vanquish this Malady: and *Crato* (in his 161. *Consil.*) writeth truly; *I think* (saith he) *that there is nothing more to be taken care of for those that are troubled with the Gout, than a right and due course of Dyet. For what Medicaments are there that can either draw forth the matter it self, or strengthen the Heat?*

And to likewise *Solenander* (*Sect.* 1. *Consil.* 20.) *We observe* (saith he) *that many by their care and diligence have made themselves free from the pains of the Gout; some by their being obstemious; others by their forbearance of Venereal embraces; a third sort, by reason of their continual using this or that proper Medicament: And others again, by their shunning of this or that kind of Meat, as hurtful in reference to this their Disease.*

Now the course of Dyet doth chiefly consist in the right use of the six things not Natural. And first of all, as touching the Air, let the excess of every Air in its qualities be shun'd; (for this may either retain, or disperse abroad the vitious humors in the Body) and especially the cold excess that retaineth and keepeth in the transpiration, and that notable exhaling of the vapors; yea and it forceth the wheyish humor from the outside of the Body unto the Centre, where it afterwards soon becometh over-hot (and boyling as it were) and then beginneth to be stird up and down. And therefore let all those that are troubled with the Gout very carefully fence themselves against the external injuries of the Air, by wearing of such warm Garments as are fit for them; and let them beware that the external Cold do not thicken the Habit of the Body, and so hinder the flowing forth of the vapors. And if it shal so happen that the habit of the Body shal be condensed, it is then again to be rarified by frequent but gentle frictions.

But more especially there is an exact and accurate regard to be had unto the Meat and Drink, and the constant Dyet of the Patient. For it being so that the Meat and Drink is wont to supply the matter of the Gout, unless the sick Person shal abstain from all food that is hurtful for his grief, or commit any errors in the use thereof, he shal but in vain hope for health and recovery. And therefore when the sick Persons shal themselves come to understand and take notice what meats are hurtful for them (as we told above of one who by the eating of Carps evermore fel into the Gout) then let them carefully and wholly abstain from them. And so also for the quantity of the food that is taken, it must be no more than what sufficeth for the refreshing of the Spirits, and the preservation of the strength of the Body. And he ought not upon any occasion to take in more food than what may rightly be concocted in the Stomack, Liver, and Spleen: which is then done if he take only that quantity of Meat and Drink that (according to the advice of *Hippocrates*) he alwaies rise from the Table with an Appetite, and that he never so fil himself with Meat and Drink, that he leave remaining no desire at all, nor any further appetite thereto. For since that in these Concoctions that which is excrementitious is wont to be separated, if those Concoctions shal not be rightly performed, many Excrements (and those Tartarous) are mingled with the Blood; which afterwards (as altogether useless) are by Nature, at her own time, thrust forth unto the Joynts. Or if it should so chance that the sick Person offend by taking too much food at one meal, he must be so much the more sparing in the meal following. And so likewise

The quantity of the Patients Food.

it

it will be to very good purpose, if once in the week he wholly forbear, or at least that he Eat a spare supper. And there ought likewise no new food to be taken until the former be Concocted. His supper must alwaies be more sparing then his dinner: and variety likewise of Meats at one and the same Meal is to be avoided, as being altogether as hurtful as the over great quantity and excess.

The quality of his Food.

And therefore let his bread be pure, and leavened; the flesh that he Eateth let it be Wether Mutton, Kids flesh, Veal, and the like, of a good Juyce and Aliment. There is likewise allowed young Beefe, especially in such as are hotter then ordinary: and *Alexander Trallianus* in his 11. *B. Chap.* 1. writeth, that he knew some who being troubled with an extream great and sharp fluxion, were chiefly holpen by the eating of Beef. Some there are that conceive there ought to be an abstaining from the flesh of Hens and Capons, and this therefore, because that it yieldeth much nourishment. But Meats of Good and much Juyce were never yet known to cast any one into the Gout, if there were not an Error committed in the Quantity. Others there are that think Cocks, Capons, and Hens, to be therefore hurtful for those that have the Gout, because that they themselves are now and then troubled with the same; which may indeed likewise happen for the Cause that we shall now shew you. For (in my Opinion) it seemeth most agreeable unto truth, that this cometh to pass, because that Cocks and Hens do likewise pick up and Eat Sand, and little Stones, and concoct them in their Maws; from which there may easily be derived into their very blood somthing that is Salt, Earthy, and Tartarous; and this may afterwards yield matter of the Gout unto him that eateth of their flesh. And this Opinion *Crato* (in his 246 *Consil.*) seemeth to favour, when he writes that the Capon hath a peculiar humor, which Nature driveth forth unto the Joynts. Let him Eat fish very sparingly; but from Carps, and moist fish (as Eeles and the like) let him altogether abstain: as also from those Meats that have in them a power to bind the Belly, or that cool the Stomach. And so likewise the use of much Cheese is not safe. He must abstain also from all kind of Pulse, that contain in them much Earthy Juyce. And because that (as *Crato* writeth in his 247. *Consil.*) between Wine and the Cabbage there is found to be a certain kind of Natural Antipathy, it is thought very fit, that such as are troubled with the Gout (as unto whom Wine is very hurtful) do often feed upon Cabbage and Barley Bread. And *Pliny* in his 20. *B.* and 9. *Chapter*, writeth thus: *I finde* (saith he) *that many have been freed from the Gout by eating the Cabbage, and drinking the broth thereof being boyled.* And many there are that upon very good ground condemn the use of apples; and advise the Physitians (led hereunto both by Reason and Observation) that they forbid the eating of Apples unto such of their Patients as they finde subject unto the Diseases of the Joynts. For Apples abound with moisture, and this for the most part partaking of some acrimony, and such as hath a power of penetrating (by reason of which it is that those spots that are caused by the Juyce of Apples can so hardly be gotten out of Linen) and therefore do very easily move the Humors. Let all fat Meats likewise be avoided, and especially fried Meats, as such as do not only afford an ill and vitious Nutriment, but also corrupt other Meats; as likewise Meats overmuch seasoned with hot Spices.

Hens, Cocks, and Capons hurtful in the gout.

But a more then ordinary Care must be had in the Choyce of the Patients drink. For it is altogether Requisite that he wholly abstain from the Moravian, Austrian, and Hungarian Wines, and such as are like unto these, which do most certainly breed the Gout. But as for others (which in such as are found do not so easily generate the Gout) they may be drunk, but it must be very sparingly, in regard that even these also contain in them some kind of Tartarous matter.

Among these Wines that are wholesome, *Solenander* in the 24. *Consil.* of his 4. *Sect.* reckoneth up likewise the Thick, Red, Spanish Wine, which they call Alicant, or the Wine they cal Tent: and of this Wine he alloweth a moderate use unto such as are troubled with the Gout, as being but little, or less hurtful for them. Others commend and allow of the *Pucine* Wine; as likewise that they bring unto us from the Vale of *Telina*; by reason that they have not in them so great a power of hurting the Joynts.

And if the Patient perceive that even these Wines also are naught and hurtful for his Disease, and that they offend him; let him then (if he can) altogether abstain from

from the drinking of any Wine; in regard that it may so be, that for such as are subject unto the Gout, even those Wines may hurt and offend them, which others drink without any hurt at all. And *Paulus Ægineta* (in his *Third Book of the matter of Physick, Chap.* 78.) writeth in this manner. *I have known many* (saith he) *who by their altogether abstaining only from wine, have all of them sensibly found help. For some in the very beginning of their Disease are perfectly freed from their fits, and others of them afterwards, and in these also the fits come but seldome; and when they come they are extreamly painful. If therefore there happen (from this abstinence) nothing prejudicial, either at present, or that nothing be feared for the future, let them abstain from Wine al their Life long. But as for those who by this their abstinence have brought a weakness and cold disposition upon themselves, and are thereby rendered unfit for their imployments, when they have for two years abstained from Wine, after this let them perpetually drink a little thereof at a time, and let it first be qualified with Water. But as for those that abstain from Wine, they ought instead of their Wine to drink the Decoction of Aniseeds, or some such like Seed, abstaining (as much as may be) from Fruits, Apples, and the rest of those Cooling Fruits.* Thus Ægineta.

And in very truth, that the Case thus stands, we have above, (in the *Second Chap.*) proved by examples. And in our own Countries, they that will may far more easily abstain from the drinking of Wine, then those in *Greece*, and elsewhere: in regard that good beer may every where conveniently enough be had, which may supply the place of Wine, and very wel serve in stead thereof. And although it seem very hard unto many (yea and hurtful also unto some) wholly to abstain from Wine, Yet Nevertheless (as it is rightly said by *Hippocrates*, in his 50. *Aphorism*) there is also somtimes a Change to be made unto that which we have not been accustomed unto. But if there be any that will not be perswaded wholly to abstain from Wine, (or if indeed they cannot, without great prejudice unto their health, as it very often happeneth) let them then drink Rhenish Wine, but not such as is strong, or Crude; or else the *Pucine* Wine also, or the like; and yet neither these in too great abundance, but with al possible sparingness. And therefore we like very well of *Solenanders* advice, who (in his 4. *Sect.* and 24. *Consil.*) perswadeth us, in the use of Wine, to have regard unto the Temperament, Constitution of the Body, Age, and Custom; since that there is great difference in Bodies; so that what is good and wholesom for one, the same may to another be altogether useless and hurtful. And therefore in the use of Wines, we are especially to observe what benefit or damage the sick person may receive from it. For if it be found that the drinking of Wine hurteth those that are thus affected, there must then be a total abstinence from it; or if it may not be wholly omitted, it must be most sparingly drunk. And as for those who in the use of Wine cannot moderate themselves, nor observe a mean and set bounds unto their Appetites, we think it fitter to forbid the use of Wine unto such persons, then to allow it them. But yet however al generally are wholly to abstain from Wine in the beginning of the Paroxysm. Neither must wine at any time be drunk upon an Empty Stomack, but then only when solid food is taken. It is likewise very hurtful to drink Wine betwixt Meals, in regard that it doth then easily penetrate unto the Liver and excite fluxions.

The quantity of his drink. Let the Patient content himself with so much drink only as may suffice for the satisfying of his Thirst, without causing any fluctuation of the food he hath Eaten.

Rest and sleep. As for his Sleep and Rest, let them be moderate; and let him not Sleep immediately after he hath Eaten and Drunk: and when he doth Sleep, let it not be above seven or eight hours at the most; yet seven hours Sleep he may well be allowed.

Exercise. Let the exercise of his Body be moderate, and let it alwaies be before dinner, or supper. And if the Aphorism of *Hippocrates* be true in any Disease, it is true in this: *viz. The exercise of health is this, not to be oversatiated with food, and to be active and industrious in paines taking,* and in the works of our calling. And very good it is for those that are able, before dinner somtimes to exercise themselves even until they sweat. But then after this motion and exercise of the Body, Let him neither Eat nor Drink, before such time as the heat contracted by the motion be wholly vanished. And if there be at any time an Error committed, in the excess either of rest or motion, better it is that it should be in motion, then in idleness

and

and Reſt. For by Idleneſs and ſlowth the heat is much diminiſhed, and the ſtrength of the Body made to languiſh, the Concoctions to be depraved, and the Excrements not evacuated and driven forth of the Body. Whereupon it is that *Galen* (in the *Sixth Sect. Epheriſm* 28.) tels us that eaſe and idleneſs is as much the Cauſe of the Gout, as Epicuriſm, and Satiety. And we may ſee by experience that Men addicted to labor and exerciſe are ſeldom or never taken with the Gout. And inſtead of the Morning exerciſe the Patient may likewiſe ſomtimes uſe frictions or Rubbings, ſo ſoon as he is up in the morning. To ſtand much, as alſo to walk overmuch, or to ride long Journeys, is greatly hurtful for ſuch as are troubled with the Gout.

And in the like manner as Exerciſe and Reſt, ſo alſo ought the Patients ſleep and abſtinence therefrom to be moderate, and alwaies in a mean. And yet of the two extreams, better it is to want ſleep, then to exceed therein; provided that the ſtrength of the Body be hereby nothing impaired, nor Crudities bred. Neither may the Patient accuſtom himſelf to ſleep preſently after meals.

Repletion, or fulneſs.

As for fulneſs and emptineſs, Care muſt be taken, that the Belly be made every day to diſcharge its office; and that the Humors may not be heaped up in the firſt waies, Eccoprotick or Cutting Medicaments are ſomtimes to be made uſe of; for theſe do gently eate and empty the Belly. Sweats in the morning are very uſeful and convenient for the prevention of the Gout, in regard that they take out of the Body the ſerous or wheyiſh Humors. And therefore the ſick perſons are by all manner of means to accuſtom themſelves unto theſe ſweats; and to this end, they ought wel to cover themſelves with Bed-clothes at night when they go to Bed; that ſo in the morning if they ſweat not, yet they may have a Moiſtneſs all over their Bodies.

Venery.

The Patient ought likewiſe to abſtain from exceſſive Venery, which together with *Bacchus* (or Wine) is the Parent of the Gout, as begetting and breeding it: for (as *Scaliger* turns it out of the Greek) of Loyn-looſening *Venus*, and Loyn-looſening *Bacchus*, there is born and bred the Loyn-looſening Gout. For by the overmuch uſe of Venery the whole Body is debilitated, and the ſpirits and Native heat diſſipated; whereupon all the Concoctions are hurt, and many Excrements are treaſured up.

Affects of the mind.

The immoderate affections of the mind, (and eſpecially Anger and Fear) are to be ſhunned; and the Patient is rather to give himſelf unto Mirth and Cheerfulneſs.

Why the Rich are more troubled with the Gout then the poor.

And that kind of Diet which is obſerved by Rich perſons, and people of rank and quality, is the true Cauſe why theſe are more frequently taken with the Gout, then poor people, and ſuch as live in the Country. For the Rich aboundeth with ſtore of al kind of Meat, and dainty diſhes; and thereupon they uſually eat of many diſhes at one and the ſame meal; and not only ſo, but they alſo exceed in the quantity, and take too much thereof, even more then they can Concoct; and hereupon Crudities are generated; and eſpecially they too much indulge themſelves in the uſe of Wine. And then again they want thoſe Laborious exerciſes by which the excrementitious Humors in the Body (and chiefly, the ſerous) might be evacuated. And moreover, for the moſt part they abhor all manner of Medicaments; and they wil not at all make uſe of them, unleſs they be fitted for their Palates.

And ſo in general, thoſe things that are by the Phyſitians (in other Caſes) commanded as touching a good and orderly Diet, they are here eſpecially to be obſerved by ſuch as are troubled with the Gout; concerning which *Alexander Trallianus* largely treateth, in his *Eleventh B.* and 1. *Chap.* and ſo alſo *Andræas Gallus*, in his *Conſil. Collected* by *Scholtzius*, *Conſil.* 270. And *Petrus Andræas Matthiolus*, *ibid. Conſil.* 220. and *Antonius Ferrus*, in his *Tract of the Gout.*

The diſtemper of the bowels to be corrected.

And yet notwithſtanding beſides a good courſe of Dyet, it is likewiſe neceſſary (leſt that the vitious Humors ſhould be heaped up) that there be no notable diſtemper ſuffered to be in the Bowels. And therefore if there be any diſtemper of the Liver, or Spleen, or that the Stomack being colder then ordinary cannot rightly Concoct, thoſe diſtempers are in a fit and convenient manner to be Corrected, as we have further ſhewn you in its proper place.

For

For unleſs thoſe Bowels be wel conſtituted (although there be little or no Error committed in point of Dyet) yet notwithſtanding, good food (albeit it be taken in a juſt quantity) is converted into a vitious humor, or ſupplieth ſuch a Blood that is not pure, but hath likewiſe vitious humors mingled therewithall. Whereas on the contrary, Thoſe that have their Bowels wel conſtituted and ſtrong (which exactly ſeparate from the uſeful Blood that which is faulty in the Meat and Drink, and evacuate it forth by convenient waies) may overcome many Errors of Dyet; as we ſee many greedy gluttonous Perſons ſtuffing themſelves with abundance of food, and guzzling in dayly great ſtore of Wine (and this not alwaies ſo wholſom as it ſhould be) and yet notwithſtanding all this they are not at all troubled, no nor ſo much as ſubject to the Gout.

But becauſe that it is altogether impoſſible but that he which lives not unto himſelf alone, but hath his dependance for the moſt part upon others, and is a Servant unto the publique, or is ſet over and imployed in other kind of affairs, and is ſomtimes neceſſitated to live in an unhealthy Air, or to ride Journeys, or to ſojourn with others; it being impoſſible (I ſay) that they can keep themſelves from all kind of Errors in point of Dyet, and that thereupon Excrements ſhould be collected in the Body; it ought therefore to be one main part of the Phyſitians care that he prevent (in this reſpect) the heaping up of thoſe Excrements in the Body, leſt that they afterwards excite the Paroxyſm; which is done if they be maturely taken out of the Body.

Veneſection.

Veneſection. And therefore in the firſt place, although the Gout doth not immediately ariſe from the Blood, as ſuch; yet notwithſtanding in regard that it may in its own manner concur unto the generating of the Gout, whiles it either maketh for and furthereth the extream and boyling heat of the wheyiſh humor, if it aboundeth; or elſe may be an impediment in the exhibition and adminiſtring of thoſe Medicaments that are neceſſary; the Blood may therefore be evacuated. But as for ſuch as have Naturally a very weak and cold Body, ſuch as theſe receive more hurt than help from this evacuation of the Blood, as *Paulus Ægineta* tels us in his 3. B. Chap. 78. and ſo likewiſe for thoſe that have already of a long time been troubled with a frequent fluxion; for by thoſe often afflicting pains, and reſtleſſneſs, the Spirits are diſſipated, and the ſtrength of the Body much dejected. But now this Evacuation of the Blood is moſt convenient in the Spring and Autumn. But yet in ſome it is requiſite that this taking of Blood from them be not done only at once, but by often repetitions, ſome now, ſome then. For if the ſick Perſon be one that uſeth a ful and free Dyet (eating and drinking liberally) upon the very firſt alteration of the Air there is wont to happen a motion and boyling heat of the humors. But becauſe that in the preſervation we are not wont to have any reſpect unto the part affected it ſelf, but only our mind and purpoſe is to evacuate the Blood when it aboundeth, it is moſt fitly taken forth (not only in the *Podagra* or Gout in the Foot) but generally in all Gouts whatſoever, by opening a Vein in the Arm. But if the Malady be in the Arm alone (as it is in the *Chiragra* or Gout of the Hands) then the Vein in the Thigh is moſt conveniently opened.

There are ſome who for ſuch as are troubled with the Gout in their Feet do prefcribe the opening of the Veins in their great Toes, and that every month, and then not all at once, but by repeating it a ſecond or third time: and I my ſelf have known thoſe that have received great benefit hereby. And this practice of theirs is grounded upon Reaſon. For Nature is wont chiefly and principally to thruſt forth the vitious humors unto the extream parts of the Body, and to the Veins, and eſpecially thoſe unto which ſhe is accuſtomed to excite a fluxion. And therefore ſeeing it is probable, that in thoſe who are troubled with the Gout Nature doth ſend the Tartarous humors in greater abundance unto the Veins in the great Toes, than unto any other parts; therefore they are moſt conveniently evacuated by opening a Vein there. Neither can the ſtrength and vigor of the Body be very much impayred by this evacuation, ſo that it be not in the extream. And that which *Coſtæus* (in his 3. B. upon *Avicen. Sen.* 22. *Tratt.* 2. Chap. 2.) writeth, that he ſaw one who having had a burning made in his Thigh by the Phyſitian, there flowed forth very frequently great ſtore of a humor altogether Black (upon the evacuation of which the Affect was wholly removed) ſeemeth very much to favor this Opinion. And others for the ſame end and purpoſe every month apply Cupping-glaſſes unto the Soles of the Feet; and this muſt be before the new Moon, and without any Scarification at all. And I know a certain Perſon of quality, who by the alone uſe of theſe preventeth the Gout.

But

But as touching the evacuation it ſelf of the ſerous and Tartarous humor, let this be by the Belly, by the ſuperficies of the Body, ſenſibly, and inſenſibly; by the Urine, and by Iſſues. *The Evacuation of the ſerous and tartarous humor.*

Purgation.

Purgation (which indeed bringeth with it the greateſt benefit of any other) is to be begun with Medicaments that evacuate the ſerous humor by the Belly. And it hath been found by experience, that ſome certain Perſons who have been troubled with this Grief have found greater benefit by often repeated Purgations, than they have by any other Medicament whatſoever; and that Purges have oftentimes benefited much with out any other Medicament whereas all other Medicaments without Purgation are altogether unavailable, or at leaſt afford but ſmal benefit. Neither is there any danger at all to be feared from theſe Purgations, eſpecially if thoſe Purging Medicaments be not overſtrong. Wherefore not without cauſe is it that *Solenander* (in his 4 *Sect.* and 24. *Conſil.*) ſo confidently affirmeth, that there is more of the Spirits reſolved by Pains, the Strength more impaired, the Limbs more weakned, and laſtly, the faculties of the whol Body more altered by the influx of the humors into the Joynts in one Paroxyſm only, than by ſeven of theſe moderate purging Medicaments; as it hath been found by the experience of thoſe that have made uſe of them. *Purgation.*

And indeed this evacuation is moſt conveniently made in the Spring time, and the Autumn, a little before the Equinoctial; at which time the humors are wont to be moved of their own accord. Yea and if any wil uſe that diligence that is requiſite in the prevention of the Gout, he muſt Purge his Body three or four times in the yeer. Which Purgation (together with Veneſection, and a right courſe of Dyet) maketh very much for the preventing the Gout; touching which *Galen* in his 7. Chap. of the way of Curing by Veneſection. *I my ſelf have Cured very many* (ſaith he) *who for three or four yeers* (*by Intervals, and at ſome certain ſeaſons*) *had been troubled with pains of their Feet, by purging forth in the beginning of the Spring the abounding humor, and by diminiſhing of the Blood. But this ought to be known and wel underſtood by all, that they are to be very moderate throughout the whol courſe of their Dyet. For as for ſuch as are intemperate, given to Drinking of Wine exceſſively, and ſuch likewiſe as are addicted to their Bellies, and indulge their Appetites, there is but little good or help to be expected by them, either from Purgation, or Blood-letting. For by the intemperancy of their lives they get together, and heap up great ſtore of vitious humors. Now as for theſe we are not ſo much as to afford them any the leaſt helping hand, or aſſiſtance*; thus *Galen*. *When the Purgation muſt be adminiſtred.*

Now it is wel worth our Conſideration, by what Medicaments thoſe Purgations are to be inſtituted, and carried on. There are ſome indeed who here commend their *Aurelii* Powders, and their Mercurial Medicaments, which do both provoke to vomiting, as alſo Purge by the Belly. But for my own part I ſhal not perſwade any to make uſe of theſe for his preſervation from the Gout: Let him do it at his own peril who ever hath a mind to it. But much leſs ſhal I perſwade any one (as I find that many have given counſel thus to do) that he four times in a month (alwaies after the Changes of the Moon) take *Mercurius Vitæ*, thereby to cauſe both Vomitings and Stools. For ſince that thoſe Mercurial Medicaments cauſe extraordinary agitations and ſtirrings of the humors, and do withall weaken the Bowels, they more hurt than benefit thoſe that make uſe of them: neither let any one perſwade himſelf, that the ſaid Cure of preſervation can poſſibly be accompliſhed in one month. *By what kind of Medicaments.*

There are others again who conceive that only thoſe moſt gentle and eaſie Medicaments are to be uſed: but theſe are ſcarcely at all times able to draw forth the peccant humor. The truth is, as it is moſt ſafe, ſo it is likewiſe moſt beneficial, to make uſe of thoſe Medicaments that indeed hurt neither the Stomack nor the other Bowels; and yet notwithſtanding they evacuate the peccant humor as much as is needful. From which neither *Scammony*, nor *Turbith*, nor *Hermodactyls* are altogether to be excluded: but *Sene*, *Agarick*, and *Rheubarb* have a chief place among them.

But beſides theſe ordinary and yeerly evacuations, there are likewiſe every month (yea, and oftener if need require) certain gentle Medicaments to be made uſe of; which ſenſibly derive the matter unto the Bowels, and keep the belly looſe. Yea, and if every week twice, one hour before ſupper, the ſick perſon take either a ſcruple of ſome gentle Pills, or ſome other ſuch like Medicaments, he ſhal ſoon find no ſmal benefit thereby. And ſuch are the *Syrup of Roſes ſolutive, and Honey of Roſes ſolutive, Syrup of the Harts*

marrow

marrow (commonly called the Domestick or House Syrup) *the seed of Carthamus or wild Saffron, Danewort* (or *Dwarf-Elder*) *Aloes, Agarick, Rheubarb*; especially where the *Colerick Ichores* abound. Yet nevertheless, seeing that these alone (as we have already said) are not sufficient, unless the party take likewise every yeer twice or thrice those Medicaments that are somwhat stronger, in the spring therefore, and at Autumn there is to be administred a Purgation that is somwhat stronger than ordinary.

But now here to set down the many forms of those Medicaments, I hold it not worth the while; in regard that such as are most proper for every ones Constitution are best of al prescribed by the Physitian who is present, and may therefore most rightly discover the Patients Constitution. And although that Serous and Tartarous humor be the nigheſt cause of this Malady; yet notwithstanding somtimes these, and somtimes those vitious humors do mingle and joyn themselves with the humor aforesaid, and they are therefore withal to be evacuated. And there are but very few purging Medicaments that do not withal likewise evacuate the said wheyish humor.

The Caryocostine Electuary of Bayrus.

They here greatly extol the *Caryocostine Electuary*, invented and commended by *Petrus Bayrus* in the 18. *B.* and 1. *Chapt.* of his *Practice*; although without doubt the Ancients (*Aetius*, and *Paulus Ægineta*) gave the first occasion for the Composition of this Electuary; and in them there are many things to the like purpose. Now the aforesaid Electuary is made in this manner:

Take *white Hermodactyls* (their upper rind being taken off) *and Diagrydium, of each two drams: Costus, Cummin, Cloves, Ginger, of each one dram, and make a Pouder.*

Of which the Dose is one dram, more or less. Or else being beaten very smal and seared, let them be mingled with the Syrup that is made of Honey and white Wine (boyled until they have attained the form of a Syrup wel boyled) and then make an Electuary: The Dose hereof is from two drams to half an ounce. And *Bayrus* writeth, that so soon as ever he perceived in himself signs of Repletion, he took this Electuary three or four times in the yeer; and by this means he kept himself (for twenty six yeers) altogether unmolested by those pains with which he had been formerly assaulted. And indeed it wil not be amiss then to make use of some Medicament that is proper, when we find there is so much of the humors already collected, that the Paroxysm seemeth to be very nigh at hand. And here we are likewise to commend unto you *Rhases* his Pills, described before in the Cure: and so likewise these:

Take *Groundpine or Herb Ivy, half an ounce; Germander, Arabian Lavender, of each three drams; Hermodactyls half an ounce; St. Johns wort one dram: Aloes Hepatick half an ounce: with Turpentine of Cyprus make Pills.*

Whether or no Hermodactyls be convenient in preservation from the gout?

But now as for those Medicaments that are made use of more frequently (every, or every other week, or three weeks, or a month together) these ought to be more mild and moderate. And here *Adrian Spigelius* writeth, that he in the preservation of himself from the Gout never made use of Hermodactyls in any Purgation; since that it is not requisite that we draw forth the Humors out of those parts into the which as yet nothing hath flown; but he adviseth us to content our selves with those things that evacuate the humors out of the greater veins; unless haply it be in the old knotty Gout (which hath more frequent invasions) or that (as we said before) the Paroxysm be now nigh at hand. Which as we grant it to be true in those Purgations that are more frequently (and in shorter intervals) administred: so in those Purgations that are to be twice or thrice every yeer, we conceive that Hermodactyls may most fitly be mingled therewithal; and these al the more experienced Physitians, even unto our daies, have made use of; as without doubt having al of them learned by experience, that Hermodactyls had in them a peculiar power of evacuating those humors breeding the Gout. And the Author of the little B. touching the *Podagra* or the Gout in the Feet, (whose name we find not, and yet we find his Book among the Writings of the principal Physitians) writeth, that he himself knew by experience, That in the Gout (whatever the peccant humor were) that Purgation that was made with Hermodactyls in it was more useful and effectual in this case than any other. And hence it is also that *Rhases* his Pills, and the Caryocostine Electuary of *Bayrus* have Hermodactyls in their Composition. But now that those Medicaments may be taken without any nauseousness or loathing in the Stomach, their forms are to be changed; and they may be taken somtimes in the form of a Pouder, somtimes of Pills, somtimes of Electuaries, and somtimes in the form of little Rolls, or Morsels, as they cal them.

A Vomit. A Vomit also is here very good, and bringeth much benefit along with it, if Nature be able easily

eaſily to bear the ſame; in regard that it doth beſt of al exclude and evacuate Color and Flegm ſticking in the firſt waies or paſſages.

Antipodagrick Medicaments; Or, *Medicaments againſt the Gout.*

The Body being purged, after this Antipodagrick Antidotes are to be made uſe of, that ſo the remainders of the Humors that eſcaped the purgations may by thoſe be quite conſumed; and that the body may (by once taking of them) be diſpoſed unto the morning ſweats; or that the ſerous humors may inſenſibly be diſcuſſed, as we ſhal anon ſhew you, when we come to ſpeak further of the power and virtue of theſe Medicaments. Thoſe kind of Medicaments were with the Ancients of very great uſe; and by them they are greatly commended: and there are very many of them extant in *Aetius* his *Tetrab.* 3. *Serm.* 4. *Chap.* 47. *Alexander Trallianus* in his 11. *B. Chap.* 62. And amongſt the latter Phyſitians alſo ſuch like Medicaments are every where to be found. *Medicaments againſt the Gout*

And among thoſe Medicaments, in the firſt place we meet with Treacle; touching which the Author of the Book of Treacle, to *Piſo*, in his 15. Chapter, writeth: *But it moſt of all profiteth* (ſaith he) *when any one ſhall frequently take thereof whiles he is yet well and in health; in regard that it conſumeth the ſuperfluous humors of the whol body, and changeth likewiſe the temperament thereof.* And a little after: *I adviſe* (ſaith he) *that every man in ſuch like diſeaſes would uſe* Treacle; *becauſe that it both drieth up the ſuperfluous humors, and permitteth not that any other be bred; whereupon very many from the uſe of this alone in the beginning have been altogether freed from the Gout.* *Treacle*

Aetius in the place alleadged hath this deſcription of the Antidote conſiſting of four things, by ſome called a *Myſtery*, viz. *The Antidote of four things*

Take *Gentian, Bayberries, Mirrh, equal parts, and make a pouder.* Give hereof every day half a ſpoonful in hot Water.

Oribaſius in the place alleadged hath another deſcription hereof.

Take *Germander one pound; Gentian, round Ariſtolochy or Birthwort, of each two ounces; Rue ſeed one ſextary: Let them be well bruiſed and ſearſed.* Give dayly hereof one ſpoonful.

That which is made of ſeven things, hath as followeth:

Take *St. Johns wort one ounce; Centaury, and Groundpine, of each three ounces; Gentian five ounces; round Ariſtolochy one ounce; Agarick three ounces; Parſley one ounce; Attick Honey five pound.* The Doſe one dram in three Cyaths of Water. *The Antidote of ſeven things.*

But *Aetius* chiefly commendeth the Antidote of Centaury; and he writeth that he knew many cured by the uſe thereof; and that it was ſo wholſom for ſuch as were troubled with the Gout, that the uſe thereof had enabled many that had been affected herewith fifteen yeers, and ſo wel recovered them that they went journeys on foot; and that it was grateful to the ſtomach, convenient for the belly, and provoking much urine. The manner of making it is thus: *The Antidote of Centaury.*

Take *the tops of Centaury the leſs, Roots of Centaury the greater, Germander, Gentian, round Ariſtolochy, of each alike, as ſuppoſe one pound.* Let one dram hereof be given (for fourty daies) out of hot water; and in the other three hundred twenty five following daies of the yeer, let half a dram be adminiſtred after the ſame manner.

And the ſame *Aetius* likewiſe very highly commendeth the Antidote of *St. Johns wort*, as that which cureth al manner of Gouts, the Diſeaſe of the Hips, and al diſeaſes of the joynts in general, being drunk for the ſpace of one whol yeer; that it warmeth and cheriſheth the ſtomach, maketh the ſight ſharp and quick; and that it maketh the reſt of the ſenſes alſo more cleer, and fitter for the diſcharge of their ſeveral Offices; that it gently evacuateth the Urine; and that it is excellent good in the falling-ſickneſs, that it freeth from the great and grievous pains of the head; and laſtly, that it mollifieth the Liver and the Spleen when they are hardened into a *Schirrus*. *The Antidote of St. Johns wort*

Now the manner of making it is this:

Take *Germander nine ounces; Centaury eight ounces; round Ariſtolochy ſeven ounces; Gentian Root ſix ounces: the tops of St. Johns wort five ounces; Parſley four ounces; Spignel three ounces; Valerian two ounces; Agarick two ounces; Honey well ſcummed three pound.*

Alexander Trallianus greatly commendeth this Antidote of the Philoſopher *Heraclitus* as much approved of by many. *Viz.* *Heraclitus his Antidote*

Take *Spicknard two ounces; Gentian, long Ariſtolochy, round Ariſtolochy or Birth-*

wort, the beſt Myrrh, Bayberries, Rhapontick, of each half an ounce. The Doſe is one dram. The beſt time to take it is the beginning of the Spring, and the Autumn; and indeed in thoſe places and perſons that are cold, the Spring time; but in others that are more hot, the Autumn.

The Antidote Diacorallium: The ſame *Trallianus* preferreth the *Diacorallium* Antidote before al other Antidotes whatſoever; which is thus made:

Take *of Corals two drams; Mirrh four ounces; Cloves half an ounce; Rhapontick one ounce; Peony Root the like quantity; long and round Ariſtolochy, of each two ounces; Spicknard four ounces; and make hereof a Pouder.*

And of this he giveth in the morning one ſcruple, out of warm water; and after it he enjoyneth abſtinence from al kind of food for ſix hours (but yet the truth is, a ſhorter time of faſting may ſuffice) & maketh the beginning hereof about the Kalends of *January*, and ſo continueth adminiſtring of it for a hundred daies (by reaſon of the long continued perſeverance of the Indication, as *Cappivaccius* explaineth it:) and then for thirty daies he intermitteth the adminiſtring of it (becauſe of the ſtrength and powers of the body, that they may be recollected, as the ſame *Cappivaccius* tels us.) And then again he adminiſtreth it for a hundred daies more; and ſo again, as before, he intermits for thirty daies. When the two hundred and ſixty daies (wherein there were two hundred potions adminiſtred) are over and paſt, he then giveth it again, but now not every day, but only every other day; and ſo in a hundred and three ſcore daies he adminiſtreth fourſcore Potions. And afterwards again in two hundred and ſixty daies he adminiſtreth eighty Potions, giving them every third day until the three hundred ſixty five Potions ſhal have been al taken. But he warneth them that take this Antidote, that they abſtain from Anger, Venery, Aſtringent and ſweet Wine, al kind of bitter Pot-herbs, the heads of Fiſh, Crabs, and Creviſhes, Lobſters, Eels, Hares fleſh, al kind of Pulſe, but more eſpecially Beans. And many more of ſuch like Antidotes there are to be found in *Paulus Ægineta, Aetius*, and *Trallianus*, in the places before alleadged.

Out of theſe afterwards (in the Ages not long before ours, and in our Age alſo) there aroſe divers other ſuch like Compoſitions. *Thomas Eraſtus* telleth us that he had two of theſe communicated unto him, and extolled with high commendations: One of them that was given him by an Italian Phyſitian (who called it the Pouder of *Jupiter*) and was imparted unto him by Doctor *Conradus Geſner*, is made in this manner following:

Jupiters Pouder Take *Round Ariſtolochy, ſuch as is right, the true Rhapontick, of each one ounce; Macedonian Parſley ſeed half an ounce; Germander tops, Centaury the leſs, and St. Johns wort, of each ten drams: make a Pouder hereof.*

In the firſt month give every day one dram hereof, out of warm Water; and afterwards half a dram, for one whol yeer; every month you muſt alſo order the Patient to take a purge or two; or elſe (for ſuch as are flegmatick) you may intermingle the Pouder of Agarick with the aforeſaid Pouder, a little to purge the ſick perſon.

The other Compoſition beſtowed on me by Dn. D. *Chriſtoph. Wirſung*, an Auguſtan Phyſitian, is thus to be made:

Take *the true round Ariſtolochy, Gentian, Rhapontick, or Centaury the greater* (but I think the true Rhapontick to be better) *the tops of Germander, Groundpine or Herb Ivy, of each alike, and make a Pouder.* Let there be one dram hereof taken for the one half of the yeer; and for the other half of the yeer half a dram.

Doctor *Johannes Mattheus* (out of an old Manuſcript) produceth this Pouder, as he there findeth it preſcribed, *Viz.*

Take *Rhapontick one ounce; Agarick two ounces; Valerian three ounces; Macedonian Parſley ſeed, and Spignel, of each four ounces; Gentian, and Ariſtolochy, of each ſeven ounces; Germander nine ounces, and make a Pouder.*

Donzellinus his Pouder is as followeth:

Take *Germander, Groundpine, both the Centauries* (or only the leſſer) *Marjoram, Sage, Betony, Gentian, and Birthwort, of each one ounce: the beſt Guajacum eight ounces or one pound: and make a Pouder.*

And by this one Remedy alone *Donzellinus* writeth that the Gout may be perfectly cured, provided that a man live not like unto a *Sardanapalus.*

Crato his Pouder is this.

Take *Ariſtolochy one ounce, Centaury the leſs three drams; Gentian ſix drams; Spignel, five drams; St. Johns Wort, ſix drams, Parſley of* Macedonia *half an ounce, Agarick two drams, Rhapontick, or (if that may not be had) Rheubarb one dram; and make a Pouder.*

a Pouder. Of which he giveth in the morning two ſcruples in the Water of Groundpine, or Betony Water (with the Syrup of either of the two former) in *January* five daies, in *February* as many, in *March* two, in *May* three, in *June* one, in *July* two, in *Auguſt* one, in *September*, *October*, *November*, and *December*, two: but it matters not much if it be oftener taken; only as he ſaith it wil be ſomwhat better to take it in the manner aforeſaid.

This following is Doctor *Manard* his Pouder.

Take *Germander*, *Dittany of Crete*, *Groundpine or Herb Ivy*, *Roots of the greater Centaury*, *and round Ariſtolochy*, *of each two ounces*: *the inward Rinds of Walnuts one pound*: *make a Pouder.* The Doſe is one dram for forty daies.

This Pouder next following is attributed unto *Eraſtus.*

Take *Harts-horn burnt*, *Beef bones burnt*, *the Kernels of the Citron*, *Dates*, *Jaws of the Luce-fiſh or Pike*, *equal parts*: *burnt Coral*, *and burnt Ivory*, *of each half parts*: *make hereof a Pouder.* Unto which (for the taſts ſake) you may add a little Cinnamon, Mace, and Cloves; and with Sugar make a Pouder.

Johannes Anglicus greatly commendeth this Pouder, which he calleth the *Sarracenick* Pouder: *The Sarracenick Pouder.*

Take *Herb Ivy or Groundpine one ounce*: *the bones of man or woman burnt two drams*: *Liquoris three drams*: *make a Pouder.*

And yet nevertheleſs the ſick perſon is not ſtrictly and preciſely to be tyed unto any forms of Pouders; but of the ſame ſimple Medicaments there may with Sugar or ſome convenient Syrup be made Electuaries or Pills (which for the moſt part are very fitly made up with Turpentine of Cyprus, ſince that moſt of thoſe that are troubled with the Gout are likewiſe obnoxious and ſubject unto the Stone) or Extracts, or thoſe Medicaments they cal Eſſences, or liquid Extracts, or a Wine, or a Medicate Drink; that ſo in this manner alſo the palat of the ſick perſon may be pleaſed.

Antonius Gallus (a Phyſitian ſomtimes of *Paris*) greatly commendeth this Electuary:

Take *Valerian one dram*: *Agarick two drams*: *Spignel three drams*: *Macedonian Parſley ſeed four drams*: *St. Johns wort five drams*: *Gentian ſix drams*: *Birthwort ſeven drams*: *the leſſer Centaury eight drams*: *Groundpine nine drams*: *Mans bones taken out of the Joynts*, *and moderately dried ten drams*: *with Oxymel Scillitick as much as will ſuffice make an Electuary*: *the Doſe whereof is one dram for a whol yeer together.* Or,

Take *the Conſerve of Germander three ounces*: *of Herb Ivy*, *and Betony Leaves*, *of each one ounce and half*: *Seeds of St. Johns wort*, *Roots of round Ariſtolochy*, *of each half an ounce*; *Angelica two drams*: *the bones of a Man prepared*, *red Corals prepared*, *Ivory prepared*, *of each one dram*: *Cloves and Cinnamon*, *of each two drams*: *and with the Syrup of Betony make an Electuary.*

And we may likewiſe add the Medicaments of latter Phyſitians, viz. their Magiſteria, their Feculæ, and their Salts; as alſo Margarites, and Crabs Eyes. As,

Take *Roots of Spignel or Maſterwort*, *St. Johns wort*, *of each one ounce*: *the Feculæ of Cuckowpint two drams*: *the Salt of Groundpine*, *of Germander*, *of Cherfoyl*, *and of Maſterwort*, *of each one ſcruple*: *Magiſtery of Corals*, *and Crabs Eyes*, *of each half a dram*: *Margarites one ſcruple*: *Sugar as much in weight as all of them*: *and make a Pouder.*

For the cauſing and provoking morning ſweats there are alſo given Syrups of the Berries of Eldern prepared with Sugar two ſpoonfuls; and if you pleaſe there may likewiſe a little Harts-horn be added.

Crato commendeth this Diſtillation, of which one ſpoonful is to be taken every day in the week once, if not oftener.

Take *Balm*, *Valerian*, *Juniper Berries*, *of each what you think fit*; *Let them be ſprinkled with good ſweet Wine*; *then macerated in Balm Water*, *and afterwards deſtilled.*

And in cold Bodies there may alſo very conveniently be uſed that *Aquæ vitæ* which *Gilbertus Horſtius Hollandus*, once a famous Phyſitian at *Rome*, made frequent uſe of; and it is thus prepared.

Take *Roſemary flowers*, *the leſſer Centaury*, *Camomile flowers*, *Groundpine*, *St. Johns wort*, *Germander*, *Aſarabacca*, *of each one ounce*; *the Rinde of Dwarf-Elder Root one handful*, *Orace one ounce*; *Treacle half an ounce*, *Cinnamom*, *Nutmeg*, *Ga-* Gilbertus Hoſtius his Aqua vitæ

lingal,

lingal, Mace, and Ginger, of each one dram and half; Hermodactyls, and Aloes Hepatick, of each one dram; Agarick half an ounce; Coloquintida three drams; all the Myrobalans, of each two drams, Roots of Polypody of the Oak one ounce and half; Leaves of Choyce Sene, one ounce; Seeds of Anise, Dauk, and Fenel, of each one dram; infuse them in the spirit of Wine, (that so the said spirit may lie a fingers breadth above them) for two daies space; and then let them be afterwards destilled in *Balneo Mariæ.* Of this Water he gave unto such as had the Gout, from one ounce to three ounces, in the morning.

The Decoction of Ground pine:

But now in the Judgment of very many the Decoction of *Groundpine* may serve in stead of all the aforesaid Medicaments, and will do better than any one of them; and therefore it was likewise highly commended unto the Emperor *Charls* the fifth by the Physitians of *Genoa*: and *Solenander* in his *fifth Sect. Consil.* 1. tels us, that it hath been found by experience, that very many which had drunk of this Decoction for the space of threescore daies, have been wholly freed from the Gout, and restored unto their healths; whereas before they had both the Joynts of their hands, and of their feet also grievously afflicted and tortured by this Disease. And no wonder, for it attenuateth the thick Humors, and consumeth them; driveth forth the Excrements by Urine, or else by sweat evidently; or else it insensibly discusseth them by transpiration: and it strengtheneth also all the internal bowels, and every kind of Nerve, yea and the whole habit of the Body. But because that *Vesalius* writeth so largely and fully touching this *Decoction* of *Groundpine*, and the advice given by the Physitians of *Genoa* (as we may see in his *Epistle to Joachimus Rœlandus, touching the China Root, about the end thereof*) We think it not amiss, neither our time ill spent, to give you his words at large, as we find them in the said Epistle. *No man* (saith he) *can blame me for administring at a fit and convenient time that Medicament which I find commended by the prime* Genoa *Physitians, as divine, and as if it were some Deity; and which (with the greatest promises that might be of the perpetual banishment of the Articular Disease) was some months since sent unto Doctor* Marsillus Colla, *(Master of the Horse to the Emperour, and one that for his many extraordinary parts, and endowments of mind, is worthy of more health then what at present he enjoyeth;) and now again also so brought unto* Cæsar, *that for the future we may most certainly conclude, and promise him, that he shal never more hence forward be troubled with the pain in his Joynts, if he please but to make use of this Medicament. Now in very truth the whole description hereof is sufficiently Empirical, and containeth in it nothing else but that at the first, and in the very beginning of the Malady, a purgation is to be administred; and then afterwards, the Leaves of Groundpine (some call it Herb Ivy, or the little and low Oak) be cut in pieces whilest they be yet green, if they may then be had, (but I for my own part would rather have it dry; and as in all other Herbs that have in them a faculty of drying, I prefer it before that which is green and newly gathered) and then boiled in white wine; and of this Decoction one Cup given in the morning, three hours before dinner: although in the mean time however it be added, that the longer before dinner the Decoction aforesaid be taken and drunk, so much the more benefit is to be expected from it. In reference to the course of Dyet, whosoever maketh use hereof must abstain from all meats that are sharp, sour, and Salt; and the drinking of that Wine is prescribed for sixty daies, with this addition, that the distilled Liquor, or Water of the aforesaid Herb, will add and confer much unto the strength of the said wine, (which seemeth unto me very ridiculous:) and that therefore for such as are not pleased with the Decoction, they are to have the Water given them. As for any thing else, we find nothing in the whole sheet sent hither unto us, besides a great and swelling Title, and a large Catalogue underneath of those persons who by the use thereof lived free from the Disease of the Joynts, for some years, and of such as made use thereof when it was sent unto them; in which Catalogue we find* Cardinal Dorias *to be the first, and foremost.* Thus far *Vesalius.* From whose words it evidently appeareth, that he himself gave not his ful consent unto the praise and commendation of this Decoction. And very credible it is, that it did not benefit al that drank it: and yet notwithstanding if we shall well weigh the virtues thereof (as they are before propounded) it wil from thence manifestly appear, that it is indeed a very excellent and precious Remedy in the Gout. But this *Vesalius* rightly tels us, and gives us notice of it, that the distilled Water cannot (in probability) add any thing unto the Decoction, in regard that the distilled Waters (as many falsly think) have not all

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the faculties and virtues of the simple; for all the parts thereof are not elevated into the Alembick.

But now this Herb *Ground-pine* may be drawn into use many several waies. Some take a pottle of *Rhenish Wine*, the *purest Water* one pint, *Honey* of *Roses*, the fourth or sixth part of a quart. Boyl all upon the Coals in an Earthen Vessel, and scum them: then add of *Ground-Pine* four handfuls, *Germander* two handfuls; *Bears Ears* or *French Cowslips*, one handful; boyl them in a double Vessel for three hours. *Ground-pine may be used many ways*

Others take *of Groundpine gathered when it first beginneth to flourish, and well kept, one handful; Wine three pints; boyl them in a double Vessel five hours, and then strain them.*

But it were far better; if the Herb aforesaid were tund up with the new Wine, and there let lie; that so in this manner a *Chamædryte* Wine may be provided, without any boyling at all.

And if any fear the Wine, he may in the like manner prepare an *Hydromel*, or a *Chamædryte* beer likewise.

Now the use of this Wine is to be continued (and so likewise of the Hydromel, or the Beer) for threescore daies, the Body being first well purged; and every day during the time one draught is to be taken in the morning.

And the like may also be made of the Essence of *Ground-pine* (as they call it) and this must be made use of for many daies.

But it is not here my meaning that any should be kept and held unto certain forms; but I would have those Medicaments to be made up, and compounded, according as occasion and the Constitution of the sick person shall require. The chief and principal Simples out of which these Medicaments are compounded (as appeareth by the forms hitherto prescribed) are, *Germander*, most useful in all the Affects of the Joynts, (and therefore by some it is also called the *Arthretick* or *Gout Ivy*) and *Lobelius* of one dram hereof with Turpentine maketh Pills, and greatly commendeth them in all Gouts whatsoever; and then in the next place, *Groundpine*, of the Virtues whereof we have before spoken; St. *Johns wort*, *Round* and *long Aristolochy*, the *lesser Centaury*, the *true Rhapontick*, *Gentian*, *Spignel*; and the *Root* of *Mugwort*, if in stead of the *Parsley Roots* it be boyled with meat, (by the use of which alone many have been freed from the pains of the joynts, as *Abraham Seylerus* writeth in *Scholtzius* his *Consilia*, *Consil.* 335.) unto which may be added the *Bones* of a *Man*, *Coral*, *Crabs Eyes*, with the rest that have been already mentioned, according to every ones constitution. *Simple Medicaments.*

For *Aetius* doth here rightly admonish us, as touching Treacle, and the like hot Medicaments, that they do not only not benefit those that are of a more hot Constitution and temperament; but that they likewise oftentimes produce Resolutions that prove incureable. But here indeed there are some that determine this to be understood only of such as are hot in the highest degree; because that *Galen* also (in his *fifth Book of the preservation of health*,) expounding the words of *Hippocrates*, (in which he forbiddeth the drinking of Wine unto those that are hot,) writeth, that this is not intended of all absolutely that are hot, but that *Hippocrates* spake it of such as were hot in the highest degree: but yet most certain it is, that great heed is here to be taken unto the diversity of Bodies and temperaments; and that hot Medicaments are more conveniently also given in *Autumn*, then in the spring time; and therefore in Bodies that are more hot Succory is wont to be intermingled with the Medicament: and as touching *Succory*, *Adrian Spigelius* likewise writeth, that he had been taught by experience, how that in a hot Cause there was nothing more convenient then the Leaves of *Wild Succory*, gathered in the month of *May*, and dried in the shade, and then given one dram thereof, for the Dose. And yet nevertheless the *Roots* of the said *Succory* are likewise very useful, if they be pulled up in the first beginning of the Spring; and the same may also as well as the Leaves be mingled together with those other Medicaments that we mentioned before.

But now in what manner these pouders and *Artipodagrick* Medicaments (commonly called Antidotes) do benefit those that are troubled with the Gout, is well worth our consideration; and as touching this very thing *Thomas Erastus* moveth a Question;

How the Antipodagrick Medicaments do benefit such as have the Gout.

Queſtion; which is this, viz. how thoſe Medicaments can correct the cold and moiſt diſtem per of the Head, or diſſipate humors bred therein. But the truth is, he moveth this Queſtion out of an Anticipated Opinion and *Hypotheſis*, whiles he preſuppoſeth that the humors (the Cauſe of the Gout) do fal down out of the Head; which that it is falſe, we ſhal anon ſhew you in the ſeventh Queſtion. Whoſoever he be that rightly underſtandeth the Cauſe of the Gout may eaſily perceive what the Phyſitians main ſcope is here in the adminiſtring of the Antidotes. For ſeeing that thoſe Tartarous humors are generated in the firſt and ſecond Concoction, and then are derived into the Veins, and at length in their own time thruſt forth into the Joynts; in the adminiſtring of the Medicaments the ſcope that the Phyſitian here propoundeth unto himſelf is this, to wit, that he may promote and help forward the Concoctions of the Stomack and Liver; and if there be any excrements generated in the Stomack (as *Eraſtus* alſo confeſſeth that there are) and in the parts neer adjoyning (to wit, the Meſeraick Veins, the Spleen, and the Liver) theſe do cleanſe them away, conſume them and diſſolve them into exhalations, and evacuate them by Sweats, and Urines: and *Carolus Piſo* writeth moſt truly, that the pores and breathing places of the Skin (whether ſenſible, or elſe even inſenſible) is ſo greatly to be accounted of, that in it alone there ſeemeth to be placed the whol buſineſs of preventing all kind of Arthritick fluxions. And this is excellently done by thoſe Medicaments, if they be continued.

Whether the Decoction of Guajacum and the like, do perform the ſame that the Antipodagrick Medicaments do?

But now here it may (not without Cauſe) be demanded, whether or no the very ſame may not be performed by the Decoction of Guajacum Wood, Sarſaparilla, China, and the like; ſeeing that even thoſe alſo do exceedingly provoke Sweats; whereupon the uſe of theſe Decoctions is by many preſcribed in this Diſeaſe of the Gout. But yet leaving every man to enjoy his own Opinion, for my own part I am altogether unſatisfied in this point. For (as *Crato* ſaith truly in his 25. *Epiſt.*) thoſe Sudorifiques (eſpecially ſuch as are made of Guajacum Wood) if they be frequently adminiſtred, do very much conſume and waſt the Radical moiſture, which is not in the leaſt done by any of the afore cited Medicaments; which do only cleanſe the humors, and diſcuſs them by a moiſtneſs and dewineſs all the Body over in the morning, or by a gentle and light Sweat, or elſe alſo diſperſe them inſenſibly. And beſides, ſuch Decoctions as theſe when they are taken in a great quantity do very much dry the Bowels, which of themſelves are for the moſt part over dry in thoſe that are afflicted with this Malady. Add to this, that thoſe Antipodagrick Medicaments before ſpoken of are moſt of them bitter; and thereupon they obtain a virtue and power of cleanſing away thoſe tartarous humors, and Cholerick Ichores that are collected about the Liver and Spleen; which virtue and faculty theſe Decoctions laſt mentioned do want; ſince they do only extenuate, dry, ſcatter the humors, and provoke Sweats. And hence it is, that *Johannes Crato* (in his 253. *Conſil.*) not without good Cauſe tels us, that to follow the Vulgar Opinion is no leſs to be deceived, than by placing any hopes and expectation in thoſe potions of China, Sarſaparilla, and the like Decoctions. For if they at any time ſeem to benefit, and yield any help, this they do by means of the exact and ſtrict Dyet that is then obſerved: and the moſt of thoſe Perſons of quality that have ſo often drunk thoſe Decoctions have been greatly deceived by the perſwaſions of others, and therefore they may do wel to ſee to it, that they may ſtumble no more at the ſame Stone. And therefore at all times if there be any vitious Conſtitution in the Bowels, and a power generating that humor, we ought carefully to look to it, leſt that by the uſe of ſuch like Medicaments that aforeſaid power ſhould be augmented; as it is moſt certain, that that diſpoſition unto the Stone that is in the Reins may be greatly increaſed by hot and dry Medicaments unſeaſonably given to break the Stone. And *Monardus* likewiſe (in the 16. B. of his Epiſtles) writeth that Guajacum doth wonderfully dry; and therefore muſt needs be very hurtful for ſuch as are of a dry temperature.

The Chymiſts do here likewiſe commend their Medicaments: and ſome of them write, that the *Arcanum* or Secret of Tartar doth remove, and by the very Roots take away the Gout: Now it is made in this manner.

The Arcanum of Tartar.

Take *Salt of Tartar depurated, or puriſied; from this draw away a diſtilled Vinegar, again and again (alwaies receiving the new) until ſuch time as it leave behind it no more at all of its ſharpneſs and Tartar. And then unto one part of this Salt add three parts of common Bole, and ſo diſtill from thence the Spirit by a Retort of Glaſs wel Luted, and fitting thereunto a Veſſel to receive, and let this be big enough. Unto one part of this Spirit pour in two parts of the Spirit of Wine, an eighth part of the Oyl of Sulphur; and a ſixteenth part of the Oyl of red Vitriol. All of theſe being wel mingled together in a Glaſs Sealed after the Hermetick manner, let them for three months be continually circulated.*

Fryar

Fryar *Basil Valentine* doth with great Praises extol the Spirit of quick or unslaked Lime. But as the Composition of this is very difficult and troublesom; so we have likewise just Cause to fear, and wel to consider, whether or no it doth not easily offend the Bowels; seeing that there is in the Salt of quick Lime a notable and manifest Caustick quality; which appeareth even by the potential Cauteries that are made out of the Ley that cometh from the said unslaked Lime. *The Spirit of quick Lime.*

And so indeed Issues do likewise dayly evacuate some of the serous humor, or a certain kind of Sanies, and thin Excrement: but Experience doth testifie, that this Remedy is not in the least to be compared with Sweats and insensible transpiration: and it is wel known that many have had some of these Issues made, and yet nevertheless they have been afflicted with the Gout, in regard that they are not sufficient to draw forth that whol humor that is in the Vessels; and much less can they evacuate that which is from day to day collected about the Bowels, and is afterwards by the Veins poured forth into the Joynts; and especially if there be committed any errors in the Course of Dyet; and chiefly if there be an excess in Drinking. *Issues.*

But yet nevertheless, if the Gout hath its Original from some old and long continued Ulcer that is consolidated in the Thighs, and the suppressed Evacuation of the *Ichor* that was wont to flow forth thereby, then in this case it wil not be amiss, but to very good purpose to make an Issue in the Thigh. And so likewise, if upon sudden stopping and healing of an Issue in the Arm there happen any fits of the Gout to arise, the Issue is then again to be opened.

What things they are that strengthen the Joynts.

The third head of preventing the Gout consisteth in the strengthening of the Joynts (as most Physitians tell us) that so they may not too readily and easily receive the humor flowing unto them. But *Carolus Piso* (as we likewise told you above) thinks that here in this thing much pains may be taken to little or no pupose, it being not within our power (would we never so fain) since that as he conceiveth, that weakness doth not consist in any distemper, or hollowness, and looseness, but in the Natural conformation, and termination of the Vessels into the extream Joynts. And although that even by this means also we may hinder and prevent that humor from flowing into the Joynts: yet he determineth that the sick Person is so far from receiving any benefit from hence, that he may also by this means be brought into great peril and hazard of his life, the matter being translated unto the Lungs, or some other noble Bowel. But in very good earnest, it is not a thing to be sleighted and nothing accounted of, that the humors chiefly flow into the Joynts, in regard that the Vessels are terminated into them: and if the matter that was wont to flow into the Joynts be transferred into the more noble Members, the sick Person may then be cast into great dangers; and as we told you above (among the Prognosticks) it is a very il sign, if the matter that was wont to flow unto the Joynts subsist and abide stil in the Body. And therefore we are not wholly to rest and confide in this Remedy, or manner of preventing the Gout; without using the utmost of our endeavor that those vitious humors may not be generated in the Body; or if they be already bred there, that they may be frequently evacuated. And yet however this is also a certain Truth, that if the Joynts be weak and ill disposed, the sick Persons are then the more frequently troubled with the fits, and not so easily freed from them. But now, in what this weakness of the Joynts especially consisteth, we have shewn you above; and we shal likewise shew you further in the eighth Question. And therfore if there be any thing in the Joynts, either left there after the Paroxysm, or collected from some vitious Nutriment, it is to be consumed; and so the Joynt hath its own Constitution and Natural temperament restored; and thus it is said to be strengthened. And therefore the Medicaments that are here useful must be Astringent, and moderately heating and drying. And yet notwithstanding such Medicaments as these are not to be administred, until al the pain and swelling be wholly vanished, and that the hard knobs likewise disappear. For whilest these are in being, Astringents do more hurt than good, in regard that they drive the humor into the part affected, and there harden it. *The third Member of preservation is the strengthening of the Joynts: whether it be necessary, or not?*

But now for the strengthening of the Joynts, and the consuming of the Reliques of the humors that are in them, the use of Grape Kernels is by many commended, as that which affordeth much benefit; touching which since that *Antonius Donatus ab altomari* hath written a whol Book, the Reader may consult the same (if he please) for his further satisfaction. This only we shal desire him to take notice of, that they are most convenienely used in the Vintage time, while they are new, and they must be such as are taken out of Grapes that are through- *The benefit arising from Grape Kernels, in the strengthening of the Joynts.*

throughly ripe: of the which seeing that in many places there is no great store, other Medicaments may be made use of instead of them. Yet notwithstanding there are some that likewise use these Grape-stones dried; and they boyl them in red Wine and Water; and while they are boyling, they add to them Sage, Betony, Germander, Primrose, and other such like Herbs; as also Earth-worms.

Baths strengthning the Joynts.

Baths do likewise corroborate the Joynts. For although they be by some rejected, in regard that by their actual humidity and heat they attract the humors unto the feet; yet nevertheless this inconvenience may easily be prevented, if Plants that heat and dry, and strengthen the feet, be boyled in the Water; such as are Betony, Sage, Germander, Roses, Cranesbil, Heath, Oak Leaves, the Wood and berries of Juniper, and the Fruit of the Mountain or wild Pine-tree.

Andemacus his washing of the Feet (which as he writeth, hath profited many that have made trial thereof) is in this manner:

Take *Lye made of the Ashes of the Beech, which is to be strained three or four times; and then add thereto as much Wine, and Allum two ounces; and heat them at the fire.* Or,

Take *Mugwort. Wormwood, Organy, and Camomile flowers, of each two handfuls: Allum, and Salt, of each one handful: Lye of the ashes of Beech, as much as will suffice; and boyl them together for a bath.*

And so likewise for the strengthening of the Joynts, very good and useful is a Bath of Juniper Wood, if the branches thereof be boyled in Chalybeat Water, until the Water be dyed and colored thereby, and hath even gotten the color of the Lye. And yet nevertheless there may also be added some ounces of Salt or Allum.

After the Bath the Joynts are to be anointed with the Oyl that is pressed forth out of the Grape Kernels, or the Oyl of Myrtle, or Roses, or some other such Oyl; touching which more anon.

Hot baths strengthen the Joynts

But hot Baths are by many most especially commended, although they be disallowed of by others; of which we shal speak further in the twelfth Question. And so likewise the Baths that proceed from Sulphur, Salt, Nitre, Vitriol, (and partly also Baths of Allum Water) are very useful if they be made use of in a due and right manner. For if the Allum abound, the Baths are then to be made use of with great Caution, in regard that they shut the pores of the Body, and render it unfit to sweat, a thing altogether necessary in such as are troubled with the Gout; and if there remain any thing in the part affected which may exhale, and be dispersed by insensible transpiration, they thrust this forth unto the Nervous and Membranous parts, and so renew the pain; the same that happened to *Fabricius* in his 5. Century, Observat. 83. Among the rest, the Hirschergensian, and Laudeccensian hot Baths in *Silesia*, the Caroline in *Bohemia*, the Badensian in *Austria*, the *Martiate* (now called the Wisbadensian baths) the baths not far from *Mentz*, and those likewise at *Emsen* upon the River *Lanus*, as also those of *Aquisgran* are al of them very useful for those that have the Gout. But the Dirt or Clay of some certain Baths is chiefly to be made use of for the wasting away of the matter that sticketh in these parts, and strengtheneth the said parts.

Where such baths are wanting, Fomentations and artificial baths may be made. The Lotions or washings of Allum Water are very much commended; but yet it is far better that there be Salt and Sulphur added unto the Allum, that so if there be yet any of the matter left behind, it may be resolved. Or,

Take *Flowers of Arabian Orrace, of Sage, Thyme, Cranesbil, of each one handful; boyl them in common Water, or (which is better) in Water wherein Iron hath been oftimes quenched: and to the straining add Sulphur and Nitre, of each two ounces; Allum one ounce: Let them be boyled again, and the parts fomented with the Decoction.* Or,

Take *Leaves of Germander, and Betony, of each one handful: Flowers of wild Roses, Arabian Orrace, Bears Ears or French Cowslips, the common Doves foot, of each two handfuls; white Vitriol one ounce: boyl them for a Fomentation or a Bath.*

Unguents and Emplasters

But the most ordinary and usual Remedy (that is made use of by many) is the Unguent we mentioned also before, where we spake of the Cure; which is made of Salt corrected or dried to a pouder (others are rather for the Salt of *Juniper*) and a sufficient quantity of common Oyl, or Oyl of Roses, mingled into the form of an Unguent, with which the Joynts are to be wel rubbed.

Solenander maketh use of this Liniment after the Lotions.

Take

Take *Oyl Omphacine two ounces; Oyl of Mastich one ounce; Salt dried to a pouder two drams; Bole Armenick three drams; Dragons blood, and Hypocistis, Frankincense, and Mastich, of each two drams and half. Let every one of these be first beaten into a fine Pouder by themselves: and then let them be mingled together with the Oyls in a Mortar into the form of a Liniment.*

The Emplaster *Diacbalciteos*, or as some cal it, the Emplaster *Diapalma*, laid on, is here likewise very useful. And this Emplaster is fit and proper in al the joynts, whatsoever the humor be that floweth unto them. And *Solenander* in his 4. *Sect. Consil.* 25. writeth, That he knew divers, who before were wont very frequently to be troubled with fits of the Gout, that by the continual use of this Emplaster, and by taking Purges now and then, were for the space of five whol yeers freed from those pains. And this Emplaster it neither defileth the part whereon it is laid, neither doth it cause any itch, or raise pushes; nor is it at al offensive, either in its smel or any other quality. Now it is fitted to the form of the Member. In the Feet shoes are made of thin Leather (but the Fox skin is more approved of) which within are to be covered over with the Emplaster *Diachalcitis*, and so they are fitted to the feet. The same Leather spread over with this Emplaster may be applied unto the Knees, Hand-wrists, and other parts. And Linnen Socks likewise washed in Wine with Water, then dryed, and drawn upon the Feet, are very useful and convenient.

Thomas Erastus commendeth the Sand stone (the Latin Physitians cal it *Lapis Sabuli*) if it be mingled with the Oyl of Myrtle, and Gentian Roots reduced into a Pouder, and laid on in the form of a Cataplasm. But yet the same *Erastus* adviseth us not to use it until it shal manifestly appear that there is no Excrement remaining in the Joynts, that may be hardened into a Tophus. And therefore he perswadeth us first of al (before we use it) to lay on once or twice the Cerote of Briony, described by *Aetius* (*tetrab. 3. Serm. 4. chapt. 43.*) that so there may be the less danger; and this *Aetius* very much commendeth.

But now as touching al manner of Topicks for the strengthening of the feet, this is to be observed, that for such as wil keep no orderly nor regular course of Dyet, neither use convenient purgations, and other evacuations, these Topicks if they be administred, it wil be without any benefit at al, yea, oftentimes to their great detriment and hurt: but unto such as live temperately, and use fit and proper Evacuations, they are administred with singular benefit and success.

Cutting out of the Veins.

Aetius (in the place alleadged, Chap. 24.) for the preventing of the Gout, commendeth also the cutting forth of the Veins that are from the superior parts carried down into the feet, done after the same manner as the *Varices* or crooked Veins in the Thighs are somtimes wont to be cut forth. But as *Hieronymus Fabricius ab Aquapendente* tels us rightly (in his *B. of Chirurgical Operations*) the extraction and excision of the *Varices* is not only harsh and difficult; but that for the most part also it succeedeth unhappily, by reason of the blood flowing out. And moreover, from this cutting forth of the Veins the lower parts are soon brought into a wasting and withering condition. And besides al this, although these Veins be cut forth; yet there is but very little benefit to be expected from thence. For if vicious Humors be heaped up in the Body, and be accustomed to flow unto the feet, their way and passage being shut up, they are carried unto some noble part, and there they may excite some other affect far more dangerous.

There may likewise, for the strengthening of the Joynts, internal Medicaments be administred; to wit, those which are appropriate unto them, as *Germander, Ground-pine, or Herb Ivy, Betony, Primrose, Sage, Rosemary*, and others of this kind, as we mentioned them before.

And this is the way and means to prevent the Gout; as *Rhases* seems in few words to comprise it, whilst he thus writeth: *If the person troubled with the Gout shall observe a good and orderly course of Dyet, and govern himself as he ought in the six things not Natural, and shall somtimes use Mithridate, or somthing else that may consume all the superfluities, and shall likewise make use of Stipticks about the place of the Joynts, this person shall be relieved.*

Chap. 8. *The Physitians Consolation in the Gout.*

Comforting the patient in the gout.

IN regard that such as are sick and diseased desire and expect from the Physitian, not Consolation, but advice, and the best of his assistance; it may seem to be besides the

Office and business of the Physitian to write any thing touching Consolation in the Gout: and indeed I should not at al have published any thing of this Nature, had I not found the same done by that famous and most eminent Man *Johannes Crato*, my fellow Citizen, and Physitian unto three Emperors, in his *Consil.* collected by *Scholtzius*. Him therefore I now shal follow, and speak somthing as touching the subject aforesaid. For oftentimes indeed Medicaments and helps of al sorts are administred unto the sick person, and yet nevertheless the Physitian doth not so obtain what he desireth. And somtimes likewise the sick party (either in respect of the condition of his life, and imployment, or else also in regard of some other parts of his body) cannot so exactly as he ought observe what is enjoyned him by the Physitian; and therefore albeit the sick person cannot then conceive any hopes of a perfect Cure, yet notwithstanding he may have somthing to comfort himself withal.

I. First of al therefore, The Gout preserveth from many other Diseases and Maladies, and it is a sure sign of the strength of Nature; which driveth forth the vitious humors in the body, out of the high way, and common road (as I may term it) or (if you wil) the principal passages, unto the extream and more ignoble parts of the body; and on the contrary (as we likewise acquainted you before in the Prognosticks) if Nature be weak, and sink under the burden, as being no longer able to expel forth these humors, then Feavers and other dangerous Diseases are wont to follow. And hence it is that Physitians (and some of them of great note) are of Opinion that the Gout many times maketh for the lengthening of the life; and that if it be ill cured it hasteneth on death. For Nature (as we said erewhile) driveth the vitious humors unto the Joynts. But if (the body being not sufficiently purged, or when there is no exact course of Dyet observed, or by reason of the long continuance of the disease, or else by reason of age) the strength be weak, and the Physitian shal then busie himself only in strengthening of the Joynts, it may easily happen that the matter which Nature was wont to thrust forth unto the Joynts, if it be stil retained in the body may be turned unto the principal parts, and so may excite dangerous Diseases, yea, and hasten on death.

II. A man all the while he is troubled with the Gout is in no danger of his life (as in other diseases he might be, to wit, burning Feavers, and others, spitting of blood, the Pleurisie, Impostumation of the Lungs, Dropsie, Epilepsie, Apoplexy, and many other) but after a short time the Man returneth unto his wonted imployments, and is oftentimes so well recovered, that there is not the least appearance of his being sick.

III. If likewise there be any thing in the World that may perswade Man unto temperance and sobriety, the Gout chiefly doth this. For whenas the pain in the Gout is most raging and intollerable, and that the Gout cannot by any thing be better prevented or mitigated, than by a frugal Dyet (and in this we find al Physitians to agree, and we have also a testimony of it from Experience it self) which causeth that not only no matter may be supplied for the encrease of the ill humors; but it likewise best of al correcteth the distempers of the Bowels: and it is the part of a prudent man rather to obey Reason than his Affections, and not to forget that of the Poet.

Pleasure with pain
Is loss, not gain.

and he ought to consider likewise that that pleasure which he taketh in a more free and liberal Dyet, is not worth, neither wil it compensate those so great pains and wrackings that must be endured in the fits of the Gout. And although it seem indeed somwhat grievous to shun al feastings, and company-keeping, yet this must be thought of, That none of those boon Companions can afterwards afford any the least help in this Disease; but that (as *Lucian* hath it in his *Tragopodagra*, about the end thereof) they wil rather laugh at, and deride a man in his pain and misery. Yea, moreover, whilst that for fear of the Gout a man accustometh himself unto a good and orderly Dyet; he doth not only prevent the pains of the Gout, but he avoideth likewise many other Diseases that proceed from the Errors in the Dyet; and a Man hereby oftentimes attaineth unto old Age. But as for such as either wil not submit themselves unto the Rules of Dyet, or else by reason of their condition of life and imployment cannot observe the same, let not these accuse either the Physitian, or the Physick, but let them blame themselves; since that (as *Galen* writeth most truly in his Tract of Curing by letting blood, Chap. 7.) *To prescribe Medicaments* (saith he) *unto that party which neither can, nor will observe an orderly and due course of Dyet, is altogether in vain, and to no purpose.* But now if a man observe a good Dyet, although he be not wholly freed from this Disease, he yet may then comfort himself in a good conscience,

and

and rest himself contented in the will and good pleasure of God. And hence it is, that *Crato*, in the *place alleadged*, writeth, that seeing diligent observation and prudent moderation in point of Diet hath been found to be alwaies helpful, and that it never hurteth or deceiveth any, to neglect it therefore may well be thought not only an Argument of the greatest folly and madness, but likewise of their neglecting and being careless of themselves, which Piety forbiddeth. And when we have the Testimony of our own conscience, that nothing hath been done by our own fault that might bring or increase the pain; it is then a very great Consolation, when we can perswade our selves that we are altogether blameless; and so can cheerfully endeavour in a right manner to bear what is necessary and could not be avoyded, and not to repine and murmure against God.

IV. And this also may comfort such as are afflicted with the Gout, that as every one hath his proper Calamity; so likewise every man hath a Commodity properly belonging to him; and that the Gout is said to be the Rich mans Disease. For although those that are troubled with the Gout do indeed suffer a great pain: yet most of them are such as have a plentiful Estate, or at least they have what is sufficient; whereas on the Contrary, there are many who although they be free from this pain, yet they lie under other daily pressures and grievances, by Reason of their poverty. The Gout (as *Cardanus* in his *Encomium of the Gout* writeth) smelleth and is sensible of sweet Unguents, heareth Songs and Musick, lyeth (proud as it is) in soft beds, upon Silken Pillows, betwixt Gold, and Pearls, and painted Tables, heareth Tales and pleasant stories, tasteth generous and Rich Wines, and the more delicate and dainty kind of Meats. It hath presented unto it pleasant and delightful flowers. Embroydered garments, and whatsoever hath ambitiously for many years been heaped up by wealthy Citizens, or even by Kings themselves. And the Gout is so far blessed, that he who is detained thereby, besides the pain it self, hath nothing to hinder him from living a happy life.

V. Those that are troubled with the Gout may likewise comfort themselves with this, that those higher faculties of their Souls and the operations of their minds are not corrupted and hurt in this as they are in most of the other Diseases; but for the most part these continue safe and sound. And the very truth is that for most of the Monuments of the Learned, we owe them unto the Gout; for had these men alwaies had their health, they had never published so many voluminous and learned works. And (as *Cardanus* in the *place alleadged* writeth) *Erasmus, a man of extraordinary great parts and learning, in our own age, while he lay diseased of the Gout, and by Reason of it kept his bed; wrote and published whatsoever of his is worth our reading.*

VI. There is likewise another great benefit and commodity that the Gout bringeth along with it, to wit, that it freeth a man oftentimes from many other troubles; and keeps off much Vain and fruitless labor, as also many grievous and disquieting Cares, (that I may use *Cadans* own words) so that if a man be required to serve a Tumultuous Common-wealth, or to give his attendance upon a pettish and froward Prince, or some imprudent friend, how can he better excuse himself, then by his having the Gout? He that hath the Gout hath the greatest part of the year at his own command: and there is no better nor honester excusing ones self from work, then by the Gout. And when there is occasion of a mans going abroad in publick to serve his own turn, it is but saying, that the Gout hath left him.

VII. And Lastly, although by art, and a good course of Diet, much help may be hoped for; yet never the less in regard that the temper of the Bowels by the long continuance and grievousness of the pains is so subverted, and the Joynts so weakned, that there is no hopes left remaining of a perfect recovery of the health, the sick person may yet in the mean time enjoy those benefits and comforts that we have mentioned, and with Patience establish his mind, after the example of that great Emperour *Charls* the fifth, who was wont to say, that to be Patient, and not much to complain and cry out by Reason of the pain, are the best Remedies against the Gout.

But seeing that it is not the part of a Physitian, (but a thing much unbeseeming him) to make himself merry with the Disease and pains of his Patient, I shall forbear to add any thing more of this Nature. But if there be any one that desireth to know

know any Elegant and conceited Jeſts upon the Gout, let him read *Lucian* his *Tragopodagra*. Which is likewiſe wel worth the Phyſitians reading, ſince that it doth moſt emphatically expreſs the vehemency of this Diſeaſe, and ſhew the Cauſe thereof (and that indeed more rightly then many Phyſitians) and Elegantly deſcribe the time of its invading the perſon, the difficulty of its Cure, the bragging and vain promiſes of Empericks, and laſtly the Patience that is neceſſary and Requiſite for the ſick Perſon.

QUESTIONS Controverted Touching the Gout.

Queſtion, 1. *Whether the Name of* Arthritis, *or the Gout, Comprehend likewiſe the Gout* Podagra, Chiragra, *and the reſt of the pains in the Joynts?*

WE have told you before that *Arthritis* is ſo called by the Greeks from *Arthron* (ſignifying a Joynt) and that therefore it very fitly agreeth with all the pains of the Joynts, (of which we have hitherto ſpoken,) but by the Barbarous and common Practitioners it is called alſo *Gutta*, but not ſo properly. And yet notwithſtanding there are ſome even of the latter Phyſitians (and among the reſt, *Franciſcus India*, one of the Phyſitians of *Verona* a City in *Venice*, in his *firſt B.* of *Gutta Podagrica*, *Chap.* 1.) who deny this Name of *Gutta* to be Barbarous and improper, it being as it were the general Name for all Diſeaſes which by deſtillation are produced in the Joynts of the Feet, Hands, Hips, and the like parts of the Body, and that therefore it deſerveth to be the general Name; but they write that *Arthritis* cannot properly be applied as a general Name unto the Gout *Podagra*; becauſe that *Galen* tels us (in the *Sixth Section of the Aphoriſm. Aphoriſ.* 28.) that almoſt all thoſe that are troubled with the pains of the Joynts are firſt of all taken with the Gout. And there are likewiſe other Phyſitians that make the pain of the Joynts ſome other, and altogether diſtinct from the *Podagra* and the *Chiragra* Gout. *Cardanus* (in *Aphoriſm.* 29. of the *Sixth Section*) writeth, that the Diſeaſe of the Joynts and the *Podagra* are not one and the ſame Diſeaſe: and he addeth, that he had ſeen many Children that were troubled with the pains of the Joynts, but not one of them that had the Gout; and that he remembereth not that he had ever read any Author who had ſeen it; and he reprehendeth *Galen*, for that he maketh no difference between *Arthritis* and *Podagra*.

But *Luc. Mercatus* (in his *fourth B. of the Curing of internal Diſeaſes*, *Chap.* 18.) handleth this ſame ſubject at large, and diſtinguiſheth *Arthritis* or the Diſeaſe of the Joynts, from *Podagra*, *Chiragra*, and *Iſchias* or the *Sciatica*; and he teacheth us that the *Arthritis* hath a Nature peculiar unto it ſelf, which conſiſteth not in pain, but in this that it ſeizeth on all or moſt of the Joynts; as alſo that *Arthritis* doth not require that weakneſs of the Joynts which is neceſſary in *Podagra*, *Chiragra*, and *Iſchias*, but that a far leſs imbecillity doth ſuffice: and on the contrary, that it requireth a far greater ſtore of matter; and that it is much more rare then the Gouts, *Podagra*, *Chiragra*, and *Iſchias* or the *Sciatick* Gout: and that *Arthritis* hath likewiſe this proper and peculiar unto it, that it beginneth with a ſwelling, and endeth in a pain; whereas in the *Podagra*, *Chiragra*, and *Iſchias* the quite contrary happeneth; and the part is firſt of all taken with pain, and then afterward it

ſwelleth:

ſwelleth: and moreover, that it doth not require fourty daies ſpace for its reſolution, and that becauſe the parts are leſs weak and infirm, and becauſe that the Humor ſticketh in thoſe parts that are more fit for reſolution: and Laſtly, likewiſe, that it moſt ſeldom or never returneth, in regard that all the matter is diſcuſſed, and wholly Rooted out; unleſs haply that by an intemperance and irregularity in the life, it collect a new fulneſs of matter. For he determineth that the cauſe of the *Arthritis* is peculiar, to wit, the internal, a fulneſs of the Veſſels, and more eſpecially of the blood; but the external is every occaſion that bringeth labor and unwonted exerciſe to the Joynts, by the which they become hot, looſened, and dilated; and the Humors poured all abroad waxing hot, and ſtird up and down flow together in theſe Joynts; which the part weakned and made looſe doth very eaſily draw unto it, and receive it.

But (as for the opinion of *Franciſcus India*) the very truth is, that the Word *Gutta* is a Latine Word, and not Barbarous; but yet to uſe it for a fluxion and Catarrh, or for *Arthritis*, is contrary to the uſe of the Latine Tongue; and therefore he may very deſervedly be accounted for no better then Barbarous that ſhall uſe this word for *Arthritis*, or prefer it before the Word *Arthritis*. And although that *Galen* (in his *ſixth of the Aphoriſ.* and 28. *Apho*.) doth indeed affirm, that almoſt all that are taken with the *Arthritick* affection (that is to ſay, the pain in the Joynts) are ſuch as have firſt of all been troubled with the Gout, yet nevertheleſs this doth not prove, that the Name of *Arthritis* fitteth not unto every pain of the Joynts: for there are likewiſe Joynts in the Feet. And as we told you above (in the *firſt Chapter*) this Name in general is ſomtimes taken in ſpecial for that Diſeaſe of the Joynts, when all or moſt of the Joynts are affected; which happeneth not, unleſs a man be firſt taken with the Gout *Podagra*. But more rightly *Guainerius* (in his *Tract of the Diſeaſes of the Joynts, Chap.* 1.) *I* (ſaith he) *when I ſaw that the* Arthetica (*for ſo all the Phyſitians of that Age by Reaſon of their ignorance of the Greek Tongue called this Diſeaſe*) *had its Name from a Limb or Joynt, (in which places the pains of the Joynts are wont to be) was willing to call all ſuch like pains (whether with a ſwelling, or without) Arthetick, like as alſo all that ever were before me have done.*

But as for *Cardanus* and *Mercatus*, I ſee no cauſe at all why they will not have the Gouts, *Podagra*, *Chiragra*, *Gonagra*, and the Sciatick pain, and al other the pains of the Joynts, to be comprehended under the Name *Arthritis*, as a *Species* under its *Genus*; or if the moſt or all of the Joynts be troubled with the like affect with that wherewith the Feet, Hands, Knees, and Hip are wont to be grieved; I know no reaſon (ſaith he) why it may not be called *Arthritis*. But this in the mean while we deny not, that every Diſeaſe of the Joynts, or every ſwelling are not properly called *Arthritis*; and that it ſomtimes happeneth, that other vitious Humors, (and not the blood, as *Mercatus* will have it) altogether of another kind from thoſe that produce *Arthritis* properly ſo called, may be heaped up in the Body; and that they may ſomtimes with, and ſomtimes without a feaver, be driven unto the parts nigh unto the Joynts, and may there excite and cauſe ſwellings, and ſomtimes alſo pains: which ſwellings notwithſtanding are not properly the *Arthritis*, ſeeing that (as *Mercatus* himſelf hath determined) they do not begin from pain, and end in a ſwelling; but on the contrary, they begin with a ſwelling, and then afterwards there cometh a pain. How much leſs then are theſe ſwellings alone worthy of the Name of *Arthritis*; and on the contrary, this Name to be denied unto thoſe pains of the Joynts, of which we have hitherto been treating: Eſpecially ſince that thoſe ſwellings do not return (as the Gout doth) by certain intervals; but although they have once or ſo infeſted and diſquieted any perſon, yet they may afterwards never again return all the whole life long. And therefore if *Cardanus*, *Mercatus*, or any others, will likewiſe have theſe ſwellings to be called *Arthritis*; let them know that the Ancients were not wont to call all kind of Tumors or Swellings, (were the cauſe what it would they ſprung from) and all kind of pains, I ſay, they were not wont to cal all theſe by the Name of *Arthritis*. And *Hippocrates* (in the *ſixth Epidem. Comment.* 4. *Text* 13.) calleth thoſe in *Ænos* that by exceſſive eating of Pulſe had gotten a pain in their Knees, not *Arthritick*, but *Gonalgick*, (that is to ſay, perſons Diſeaſed in their Knees) and touching this we ſhall ſpeak further in the Queſtion next following.

Queſt. 2.

Quest. 2. *Whether every pain about the Joynts deserve the name* Arthritis.

THere are indeed some of this Opinion, that every pain that happeneth about the Joynts is to be called *Arthritis*; since that if there be any other such like pains, they are no where expressed by any of the Physitians; neither hath any of them written of any pain of the Joynts that is not Arthritick. And although we may meet with some kind of seeming difference, either according to the greatness, or according to the duration of them (a shorter or a longer time) they conceive that this difference doth not at all vary the species or kind thereof.

But I think that *Galen* (in the third Section, Aphorism 15. and 16) writeth most truly; that if the filthiness be so great that it may dry up and consume the moisture of the Joynts, it may then indeed cause a difficulty of the motion, by reason of the drineſs in the Joynts, and that it may haply cause pain likewise; yet nevertheless it never produceth that affection which is called *Arthritis*; unless any one be minded to call all pains whatsoever of the Joynts by this name. For *Hippocrates* himself, for such as by the over-eating of the bitter Vetch *Orobus* and other Pulse had contracted these kind of pains, he doth not call these Persons Arthritick, but Gonalgick Persons. And therefore although we scarcely find any Author handling all such pains as these in any one place, yet nevertheless we find them treated of and mention made of them here and there, in several places of the same Author. For it very frequently so happeneth that vitious humors heaped up in the Body, may be by a Feaver (or else also without a Feaver) thrust forth into the Joynts, and more especially the Knees, and may there occasion pains which may oftentimes continue a long while; and such no doubt were those mensioned by *Hippocrates* in the place afore alleadged; which if not alwaies, yet when the sick Person desireth to move his Feet, they then excite Pain: unto which notwithstanding (to speak properly) the name *Arthritis* properly so called, doth not suit nor agree. So in such as have Dropsies and such as are Cachectick, or of an ill constitution, the serous humors falling down into the Feet may indeed excite there a swelling; and those very humors likewise when the Feet are moved may breed and cause much pain, which yet cannot be said to be the Arthritick pain. Neither doth the humor then flow into the part affected by and thorow the Veins, but it by little & little descendeth thereinto by the Pores in the Abdomen. And if we exactly weigh the matter, we shal find that such like humors as these do not seiz upon the very parts themselves that constitute and knit the Joynt together; but that rather a humor from without is poured forth and floweth round about these parts, and sticketh fast between the Skin and the parts constituting the Joynt. And so in the loosening of the Joynts in Wounds, and in Contusions, the humors do oftentimes flow unto the Joynts, and there cause a swelling and pain, which yet is not worthy of the name *Arthritis*. And to those that have their Joynts much dryed and hardened (as it is in the Scurvy and other Diseases) these Persons cannot stretch forth, nor move those Joynts without pain, and yet they are not to be accounted Arthritick Persons, neither do we call them so.

And therfore the *Arthritis* properly and in special so called, is only that pain of the Joynts, when the peculiar humor described above, bred in the Bowels of the lower Belly, and heaped up in the Veins and Arteries, by them suddenly floweth into the Joynts, and insinuateth it self more especially into the sensible and tender parts about the Joynts, and there partly by twinging, and partly by distending causeth pain.

Quest. 3. *In what place the humor that exciteth* Arthritis *consisteth.*

MAny indeed there are of this Opinion, that the humor the Cause of *Arthritis* doth consist especially in that Cavity or hollow space that is betwixt the extremities or heads of the bones (which by Articulation are joyned together) and that the humors flowing together by the Veins do first of all flow unto those Cavities of the Joynts, and that they then afterwards seiz upon all the parts lying round about, the Bones and the Skin; from whence it happeneth that the Bones sundering themselves, and departing one from the other, the Ligaments, and Nerves, and Tendons, are all of them so extended, that from thence there is excited a most vehement and wracking pain. And for this their Opinion they first of all alleadg that which *Hippocrates* writeth (in Sect. 6. Aphorism 49.) that the *Arthritis* is not ended before the fourtieth day, and that the humors that have flown unto the part affected are not sooner discussed as being such as stick in a part destitute of heat;

heat; whereas if they conſiſted in fleſhy parts, and ſuch as have many Veins and Arteries, they might eaſily be reſolved. And ſecondly, they go about to prove it by this, becauſe that from the afflux of the humors into the Cavities of the Joynt the bones are made to divide themſelves one from the other, and ſo by diſtending the Tendons and Membranes they cauſe the pain. Thirdly, becauſe that by the motion of the joynt the pain is encreaſed. Fourthly, becauſe that a pain is firſt of al perceived in the bottom of the part affected, before ever the external parts begin to ſwel; but that afterwards when the humors have gotten themſelves a way unto the outward parts, the external parts are then lifted up into a ſwelling.

But the contrary Opinion, which determineth that the fluxion is firſt of al made into the very parts incumbent upon the joynt (from whence they may haply ſomtimes, but this is very rare, ſwear through into the Cavity or ſpace of the joynt) is altogether more agreeable unto the Truth: and this we are taught firſt of al by the very breeding it ſelf of the *Arthritis*. For ſince that the afflux of the humor generating the Arthritis is by thoſe Veſſels that carry along the Aliment unto the parts (as we ſhal afterwards prove) it is neceſſary that the vitious humor that inſinuateth it ſelf into the joynt ſhould firſt of al flow into the parts lying upon the joynts, and keeping them cloſe together; and that from hence (if there be any great ſtore thereof) it may inſinuate it ſelf into the Cavity of the joynt. Secondly, the bones are ſo knit together by the ſtrongeſt Ligaments, that there is hardly any ſpace at all left into which the matter may inſinuate it ſelf. Thirdly, The Ligaments are very thick and ſolid, ſo that they wil not eaſily admit of the humors flowing in unto them; and much leſs wil they permit them firſt of al to flow into the very Cavity of the joynt. Fourthly, if the matter ſhould flow into the very Cavity, and the bones thereupon divide themſelves the one from the other, the Membranes would then be made longer; which yet we ſee is never done. Fiftly, in the knotty *Arthritis*, thoſe hard knobs that are ſomtimes taken out of the joynts, are not found in the ſpace between the bones, but about the Ligaments, and the parts encompaſſing the joynt. Sixtly, if the humor ſhould firſt of al flow into the very joynt it ſelf, and that it ſhould from hence be communicated unto the external parts, there would then be excited either no pain at al, or ſuch as would ſcarcely be perceived; in regard that the heads of the bones (in al that ſpace in the which they are knit the one to the other) are not covered with any *Periоſtium*, but only with a Cartilage; and there is no Membrane or Nerve at al in that place. Seventhly, the tumor or ſwelling that ſeizeth upon the external parts, and from the juncture of the joynt is ſomtimes extended far abroad unto the parts lying neer unto it, it ſufficiently teacheth us that the humor, the cauſe of the *Arthritis*, is not contained in the very joynt it ſelf, but in the parts about the joynt. And laſtly, if the humor ſhould be contained in the very Cavity between the bones, it could not be (which yet we ſee that it often ſo cometh to paſs) that cooling and repelling Medicaments ſhould forthwith drive back the humor from the place affected into the Veſſels, and from hence into other places.

And as for whatſoever they alleadg and bring for the contrary Opinion, it may be eaſily anſwered. For firſt of al, That the humors in *Arthritis* are oftentimes long ere they can be diſcuſſed, the cauſe is, not that the humors are contained in the Cavity between the bones; but becauſe they ſtick in places void of blood, and therefore having but little heat in them; and the humor it ſelf likewiſe is ſomwhat unfit to be perfectly diſcuſſed. Neither yet nevertheleſs is this alwaies true; for oftentimes alſo the matter is diſperſed and ſcattered in a very ſhort ſpace of time, to wit, when there is not much thereof, when it is thin, when the Part is cheriſhed with heat, and the matter not thickned by unfit Topicks.

And moreover, the pain is not therefore excited becauſe the Joynts are ſtretched forth in length, and made longer, and ſo are ſeparated one from the other, but becauſe that a ſharp humor flowing into the Membranous parts doth diſtend, and twinge them. And thirdly, although the pain be more excited while the joynt is moved; yet this happeneth not therefore, becauſe that the humor is contained in the very joynt (for as we told you but even now, this is void of ſenſe) but becauſe the Membranous parts about the joynt, being before preternaturally diſtended by the humor, are now more ſtretched forth. Neither laſtly doth that prove that the humor doth firſt of al fal forth into the ſpace of the joynt, becauſe that the pain, when the Diſeaſe firſt ſeizeth the party, is perceived to lie deep, before the external parts ſwel up, which when it happeneth the pain is mitigated. It is true indeed that theſe things do often ſo come to paſs, and that in the beginning there is very little or no ſwelling appearing, and that yet in the mean time the pain rageth in the top of the part affected, and

there becometh moſt grievous; which is afterwards aſſwaged when the external parts ſwel up. But this doth not therefore happen, becauſe that the humor falleth into the very Cavity of the Joynt, and from hence maketh it ſelf a way unto the exterual parts, the extream parts of the Bones being (as we ſaid before) altogether deſtitute of ſenſe; but it happene h from hence, that the whol vitious humor doth firſt of all by the extremities of the Veſſels flow unto the Nervous and Membranous parts about the Joynts, and greatly affl & them; but afterwards when part of the humor is likewiſe diſtributed into the fleſhy parts, the pain becometh more mild and moderate; when the humor is diſtributed into many places, it doth then act leſs powerfully; and thoſe parts are made more looſe and ſo are diſtended with leſs pain than otherwiſe: like as we ſee the very ſame to be in the pain of the Teeth, which at firſt is very great and intollerable, when all the humor floweth into the Teeth, and theſe Nerves inſerted into them; but afterwards when part of this humor is diſtributed into the Jaw lying neer, as likewiſe the Gums, then the pain is mitigated. But yet in the mean time (as we ſaid before) we deny not this that at length alſo even ſome of the matter may poſſibly ſweat through into the very Cavity of the Joynt, if the afflux continue long. Neither do the two laſt Aphoriſms of *Hippocrates* make at all againſt our Opinion; where (in the ſixth Section) he thus writeth: *Thoſe* (ſaith he) *that have been long conflicting with the pain of the Hips, if in theſe the top of the Thigh fall out of the Hip-Bone, and then return and fall in again, theſe have in that place a Mucous and ſnotty flegm collected. And again, they that by being vexed with a long continued Sciatica pain have the top of their Thigh fallen out of the Hip, in theſe the Thigh waſteth away, and unleſs they be burnt, they halt and become lame.* For that Joynt doth not therefore fall forth, becauſe that the Bone is thruſt out of its place by the humor fallen into the Cavity: but (as *Galen* in his Comm. upon the Aphoriſms teacheth us) becauſe the bonds of the Articulation being ſoaked and moiſtened by the flegmatick humor are thereby rendred more looſe.

But now what thoſe parts are about the Joynt that receive and entertain the humor that floweth unto them, neither do they al fully agree in their Opinions as touching this. *Capivaccius* and ſome others with him determine that this afflux is made only unto the Ligaments, and that in the *Arthritis* the Ligaments are filled ful, but not ſo the Nerves and Tendons; ſince that if theſe parts were filled there would then be Convulſions: for theſe parts come to be affected only by the conſent of the Ligaments, whiles that they are preſſed together by theſe Ligaments being filled with the humor. But the Ligaments are ſo hard and ſolid, that it is not credible that theſe eſpecially ſhould receive the humor flowing unto them, and be repleniſhed thereby. And the pain is not therefore excited, becauſe that only the Nervous and Membranous parts are preſſed together by the Ligaments preternaturally filled with the humor. For if this were the Cauſe, the pain could not poſſibly be ſo fierce and bitter; but becauſe that a ſharp and gnawing humor doth prick and twinge the tender and ſenſible parts. For as in other parts the Membranous *Perioſtia*, and Nerves, are the ſubject of the pain: ſo likewiſe in the *Arthritis* they contain the higheſt and moſt immediate Cauſe of the ſaid pain. But now that there is no Convulſion excited, we have already ſhewn you the reaſon thereof above, to wit, becauſe that the parts that are by Nature aſſigned for motion are not affected, but ſuch only as are appointed for ſenſe, as the Membranes, or the Nerves likewiſe themſelves (ſuch of them as are not deſtined unto motion) according to the Membranes.

Queſt. 4. *What kind of Feaver that is that accompanieth the* Arthritis.

THere are indeed very many that aſſert this Feaver to be only ſymptomatical. But ſince ſymptomatical Feavers are thoſe properly which follow the Inflammations of other parts (and more eſpecially the Bowels) to wit, when that heat that is in the affected Member, or likewiſe even the putrid and ſooty vapors are communicated to the heart, and kindle up the heat in it, and ſo the fewel of the Feaver is in another affected part: it eaſily from hence appeareth, that the Feaver which is joyned with the *Arthritis* is not Symptomaticall, but primary. For in the Feaver that accompanieth the *Arthritis*, the Fewel of the Feaver is not in the part affected (that is to ſay, the part that laboreth under the *Arthritis*) but it is in the great Veſſels. Yea and the Feaver either it precedeth the *Arthritis*, or elſe it invadeth together with the invaſion of the *Arthritis*, and doth not in any wiſe follow the ſame. And therefore this Feaver is deſervedly referred unto thoſe continued primary Feavers, which now adaies we cal accompanying Feavers; to wit, thoſe that are not ſolitary, but ſuch as have ſome other Diſeaſe joyned with them, and that depending upon the very ſame cauſe with it; to wit, when by the motion of ſome humor which Nature endeavoreth to thruſt forth

forth unto ſome outward part, or into the habit of the Body, a Feaver is kindled; or at leaſt the matter that is moved unto any part, becometh withall ſo putrid, that it may cauſe and kindle a Feaver. And as it is in the *Eryſipelas*, Pleureſie, ſmal Pocks and Meaſels, and the like Diſeaſes; ſo this cometh likewiſe to paſs in the *Arthritis*; which ſuch a like Feaver is wont oftentimes to precede, and to invade the Party a day before; or at the leaſt, moſt certainly invadeth together with it; although it be oftentimes very ſmal; and therefore it is not ſo much as taken notice of by many ſick Perſons, and eſpecially ſuch as altogether heed and mind nothing but their pain. But now this Feaver is continual; which yet nevertheleſs remitteth ſomwhat in the morning, but about the evening returneth again in its ful heigth; and this happeneth from the return of the Blood unto the inward parts; this being either voluntary, or elſe ſuch as is cauſed by the coldneſs of the ambient Air, very familiar unto all continual Feavers.

But the very Feaver it ſelf according to the nature of the humor (which together with the humor that is the nigheſt cauſe of *Arthritis* is ſomtimes excited) is wont to be augmented day after day. Now that humor which kindleth the Feaver is not contained in the Veins alone, but ſomtimes alſo in the Arteries; and then the ſigns of putridneſs are not ſo evident and apparent in the Urines: yea in the beginnirg the Urines are oftentimes very thin, and like unto cleer Water, wanting a ſetling; which kind of Urines are likewiſe very familiar in other Diſeaſes that proceed from the motion of the ſerous or wheyiſh Blood.

Queſt. 5. *Whether the failing of Mulberries may produce the Gout; or whether the Fruits of the Mulberry Tree may Cure the Gout?*

THe Occaſion of this Queſtion was at firſt given by *Athenæus*, who in the ſecond B. of his *Dipneſophiſt.*. thus writeth: *Pithernus* (as ſaith *Hegeſander*) *hath left it behind him for our information, that in his Age the Mulberry Trees did not bear any fruit for twenty yeers together; and that then the Gout as a common and Epidemical Diſeaſe raged ſo fiercely among the People, that it ſeized upon not only Men, but even Children, Virgins, Eunuchs and Women: and not only ſo, but this Diſeaſe became ſo vehemently outragious among the ſmaller Cattle, that it ſwept away two parts of all their Sheep.* Whereupon ſome thought that this happened by reaſon of the defect of the Mulberries for thoſe twenty whole yeers; and they attributed unto the Mulberry Fruit a Power and virtue of curing and driving away the Gout. And true indeed it is, that Mulberries do looſen the Belly, and that they afford much benefit unto a hot and boyling Stomack: but that they ſhould have in them any power, or peculiar virtue to cure People of their Gout, this neither Reaſon, nor Experience can perſwade us to. Neither can this be proved from hence, that when Mulberries were wanting for twenty yeers, the Gout greatly raged among the common People. For it is more probable, that by reaſon of ſome extraordinary notable faultineſs in the Air (which ſo continued for twenty yeers together, that it every yeer hurt the Mulberry Trees) vitious humors fit to generate the Gout were heaped up. Which may appear even from this, that not only Men and Women, but even the Sheep alſo (which yet never eat of the Mulberry Fruit) were not free from this Diſeaſe.

Queſt. 6. *What the Cauſe of* Arthritis *is?*

VVE have told you indeed that the nigheſt and moſt immediate Cauſe of *Arthritis*, is the ſolution of continuity in thoſe parts that are about the Joynts, proceeding from a humor that hath flown into them, whiles it either diſtendeth thoſe parts, or elſe prickeh and launceth them; or elſe doth both theſe. And yet notwithſtanding as touching this thing, the Phyſitians do not a little differ among themſelves; and as for the nigheſt cauſe exciting the *Arthritis*, ſome of them determine one thing, and ſome another. Which diſagreement among Phyſitians, I conceive hath not been the leaſt Cauſe why the *Arthritis* hath oftentimes been ſo unhappily and unſucceſsfully cured. For when the Cauſe of a Diſeaſe is not ſufficiently agreed upon, it is not poſſible that the Cure ſhould ever be rightly performed.

Whether a bare diſtemper may be the Cauſe of Arthritis?

And firſt of all, there are ſome likewiſe that do indeed reckon up a naked and bare diſtemper among the Cauſes of *Arthritis*, and this is alſo aſſerted by *Coſtæus* (in his third Book upon *Avicen.. Fen. 22. tractate* 2. Chap. 5.) for this reaſon, becauſe that ſomtimes there is a pain felt, without any ſwelling at all, which is wont to be joyned unto a diſtemper with matter. But a bare diſtemper (let it be even what it wil) is not the nigheſt cauſe of this Affect, ſeeing that the diſtemper that ſomtimes excites ſo long a continuing pain, cannot poſſibly

ſubſiſt alone; neither can it likewiſe be the cauſe of ſo great and grievous a pain. And moreover, the very humor it ſelf (oftentimes manifeſt enough) doth ſufficiently ſhew that beſides the diſtemper there is likewiſe preſent an afflux of the humors.

And although in the beginning there is oftentimes no ſwelling at al that appeareth outwardly, yet neither doth this ſufficiently evince that there is therefore no humor within. Like as in the Pleuriſie, the Toothach, and the many other pains of other parts, the humor lying hid within diſcovereth it ſelf by pain alone, but by no ſwelling at all. Moreover, purging and ſweating Medicaments are of ſingular uſe in the curing and prevention of this Diſeaſe; which yet are no waies neceſſary in a pure diſtemper.

And although that *Paræus* relateth a Hiſtory of his own Diſeaſe, by which he would prove that a naked and bare diſtemper may produce the *Arthritis*; yet this ſtory of his doth not ſufficiently prove that there was no afflux at al of the humors preſent; ſince that the qualities of the external Air may excite an afflux of the humors. *Petrus Salius Diverſus* indeed (in his Tract of the affect. of the parts) maketh mention of an *Iſchias* or *Arthritis* from drineſs; the cauſe whereof was neither known to *Galen*, nor yet unto any of thoſe that came after him: but *Hippocrates* only knew it, as appeareth in his B. of the internal Affections. But (as he writeth) we are not by drineſs to underſtand any dry diſtemper of the parts conſtituting the joynt it ſelf (to wit, of the bones, ligaments, and tendons) but a waſting and conſumption of its glutinous humidity, by which it is naturally nouriſhed, and whereby the joynt it ſelf is oyled as it were, and made the more fit for motion. For if upon any occaſion whatſoever it ſo happen that this humidity be wholly dried up, there the motion of the joynt is hindered; and a difficulty of the motion, and withal a pain ſucceedeth. And he tels us, that this Affect, if it be in the joynt of the Hip, it is then by *Hippocrates* called the *Iſchiadick* or *Sciatick* pain; but that he himſelf had likewiſe taken notice that it might be bred in any other joynt whatſoever.

But *Galen* was not ignorant of this Affect; only he denieth it to be the true *Arthritis*; and he tels us that it was only a certain kind of Impediment in the motion, whilſt that in the third Section, and 16. Aphoriſm, he thus expreſsly writeth: If immoderate drineſs conſume the humidity of the joynts, it then indeed cauſeth a certain difficult motion by reaſon of the drineſs; and perhaps likewiſe now and then a pain. But that this paſſion (which they cal *Arthritis*) is in no wiſe cauſed, unleſs any one be diſpoſed to cal al the pains whatſoever of the joynts by the name of *Arthritis*. And moreover (I ſpeak it without detracting in the leaſt from the worth of men ſo eminent) be it ſo indeed, that ſuch a pain and impediment of the motion may proceed from drineſs: yet I much doubt of this, Whether or no this pain be cauſed only by the waſting of that humidity whereby the heads of the bones are as it were anointed and oyled. For in the whol ſpace in the which they are joyned together, the bones are not covered with any *Perioſtium*, and thereupon they are wholly void of ſenſe; and therefore in this place pain cannot be excited. But it ſeemeth to be more agreeable to truth (if there be any impediment of the motion, or any pain excited in the joynts by reaſon of drineſs) that this happeneth by reaſon of the over drying of the Tendons, the extremities of the Muſcles and Ligaments; by means of which the Members are rendered unfit for motion: and if it be ſo that they ought to be moved, there is a neceſſity of their being violently extended; and this violent ſtretching forth breedeth a pain.

Whether a windineſs may cauſe the Arthritis?

Seeing therefore that a naked and bare diſtemper cannot cauſe the *Arthritis*, it remaineth that we make enquiry from what matter it may be excited. There are ſome indeed (as *Guainerius*, and *Matthæus*) that make mention of windineſs, and of the degrees thereof. But a windineſs cannot poſſibly excite ſo great a pain, and oftentimes alſo of long continuance in theſe parts; unleſs by windineſs any one be minded to underſtand the ſpirit; touching which we ſhall ſpeak more hereafter. And although the pain be oftentimes movable, and flitting from place to place; yet this is not from any windineſs, but from the humor, which is alſo moſt apt and fit for motion.

Nakir *what kind of Affect it is.*

There are ſome likewiſe that unto *Arthritis* refer that Affect which by the Arabians is called *Nakir*; which *Albucaſis* (in his ſecond B. and 93. Chap.) thus deſcribeth: *There is* (ſaith he) *in this Country of ours a certain ſickneſs or Diſeaſe which they call* Nakir; *and it is a pain that happeneth in ſome certain Members, and afterwards is changed from one Member to another: and of this diſeaſe I once ſaw ſuch an Example as this that I ſhal now relate. I was upon a time called unto a certain woman being ſick and weak in a Village not far from me. She uncovered her Arm, where I beheld a ſmal Inflation in the Vein of the Arm; and about an hour after I ſaw this Inflation to proceed forward with great ſpeed (like as a worm creepeth) and aſcending upwards unto the Shoulder much ſooner than could*

could possibly be imagined; and it was moved upwards like as Quick-silver is moved when it runs from place to place. The pain therefore departed out of the place where it was at first, and fixeth it self in the Shoulder. And afterwards, as she her self told me, it rowled up and down throughout the whole Body; even as I my self might very easily discover it to be so. I therefore greatly admired the swiftness of its motion from Member to Member; for indeed I had never until now seen any such kind of Disease as I saw in this Woman. Indeed I have seen many that have felt the pain changing and going from one member to another, but not after this manner, or with this celerity; neither could I here conjecture any other cause then this to wit, that the Woman was quite spent, and dispirited by the heat of the Sun, and her hard labor and pains-taking, (such as they are wont to undergo that live in villages) her Body being very dry, and her Veins uncovered. And hereupon therefore that windiness appeareth to be changed even sensibly; and of necessity it is that it cannot appear after this manner in such as live idle and delicated lives, and in moist Bodies, and where the Veins are kept covered. And therefore whensoever thou attempteſt the curing hereof, and the Patient Feel that pain, then if it be the same, it appeareth to the Eyes, as we said before. Then hasten and bind both upon it, and under it; and cut upon it, till the Windiness that is pent up and kept in hath a vent and passage made for it to go forth; and Cauterize the place. But if it be so that thou canst not see the place that is affected, and the pain, then Cure it with the excussion of the Body, and some kind of Remedy that expelleth windinesses, and extenuateth them. And for this purpose, very necessary and useful are the Fœtid *Pills, the Pills* de Sagapeno, *and the like.* Thus far *Albucasis.*

But this Disease is not *Arthritis.* For neither is it only about the Joynts, but it ariseth from a Windiness, or furious spirit poured forth out of the Vessels, and running to and fro throughout all the external parts of the Body. There are some who think that this motion of windinesses, and spirits, is made in the Veins themselves. And true indeed it is, that oftentimes in the Vessels and Bowels such like windinesses do run up and down with great violence and rushing; like as *Antonius Benivenius* (in his Tract of *hidden Diseases*, and *the Cure of the Causes, Chap.* 81.) Relateth that *Ludovicus Nicolinus* was so affected with a winde rushing violently into his Bowels and Stomack, that not only his Bowels and Breast, but his shoulder-blades were likewise extended with an incredible pain; and he was likewise sorely troubled with a great and miserable streightness of breathing; whereupon also he died the third day. But in that History of *Albucasis,* it is probable, that the Flatulent and windy spirit that he speaketh of was poured forth of the Vessels into the very superficies and out side of the Body. For seeing that the motion there spoken of was joyned with a great pain, that spirit could not be contained only in the Vessels, as being such that are destitute and void of all sense.

And some there are who think (and this rightly enough) that this Affect, (if it be not one and the same, yet that it) is very neer of kin unto that described by *Wierus,* in a peculiar Tract, (in a Book he wrote in the *German Tongue,* touching *unknown Diseases*:) of which likewise *Henricus a Brar,* wrote an Epistle to *Petrus Forestus*; which Epistle is annexed unto the *observations* of *Forestus,* in his *twentyeth B.* of *Observations.* Those of our times do for the most part refer them to inchantment; and they tel us I know not what of Elves and Fayries that (as they conceive) breed those pains; when yet notwithstanding these and such like of flitting pains that run up and down in the Body may also have their Natural Causes, and they may have their Original from a certain sharp Flatulency, or a sharp whey bred out of a Humor almost Scorbutick, and roving up and down the Body by the Membranous parts and Muscles. And from hence it is also apparent, that they cannot be fitly referred neither unto the *Dracunculi* of the Ancients; in regard that there is here no worm that lieth underneath. The *Westphalians* for the Cure hereof use (as a peculiar Remedy) Earth-worms; of which see *Wierus,* in the *place alleadged.*

But we shall add no more touching this affect, in regard that it doth not properly appertain unto *Arthritis,* of which we are now treating. And yet by the way I think it not fit to pass over in silence what I find mentioned in the Histories of those that were troubled with the *Arthritis,* (which *Forestus* bringeth in his 29. *B.* and so likewise in his 14. *Observation*) where we find mention made of one *Hugo Cornelius,* twenty eight years of Age, who over wearied and tired out in the imployments of his

his Husbandry, and very sleepy as he was, laid himself down upon the Ground, and there he slept for some certain hours; at length awaking, in his left hand, about the wrist, he felt an intollerable pain, which at length seized his whole Arm, insomuch that he was not able to move his Hand, or so much as to stir his fingers, which were now grown stiff as it were: and soon after he was troubled with the same pain about the Foot, unto which was added likewise a very strong and violent Feaver. Of all which notwithstanding by purging and altering Medicaments, and by the administring of Topicks, he was cured in seven daies times, or less. Where he likewise maketh mention of another, who very drunk as he was lying all night in his Garden upon the cold ground, when he awoke was immediatly taken with a violent feaver, and most intollerable pains, of which in a very short time he died. But as it seems to me, those affects were not properly Arthritick, but rather acute feavers contracted from Vapours exhaling out of the Earth, which they both of them received by sleeping thereon; in which feavers Nature thrust forth part of the vitious Humor unto the extream parts of the Body; and so from this Humor there were not only pains excited in the Joynts, but also in the whole Arm, the Membranes of the Muscles being there affected: and so great was the pravity of this Humor, that it likewise snatcht away one of these two by a sudden Death.

Whether a Humor, and what kind of humor it is and whether al the four Humors may be the cause of Arthritis.

Seeing therefore that neither a naked and bare distemper, neither yet a windiness alone can be the cause of *Arthritis*, most Physitians indeed therefore agree in this, that it is some Humor that causeth the *Arthritis*: but what kind of Humor this is, herein they greatly differ. Some of them think that all the four Humors (to wit, Blood, Choler, Flegm, and Melancholly) may be the cause of *Arthritis*: and this they endeavour to make good more especially from hence, that in *Arthritis* there appear many different colors of the swellings, divers kinds of pains, and various accidents; the term of the declination not one and the same, and a much different way and Method to be observed in the Cure, according to the variety of the Causes. To wit, (that I may use the very words of *Petrus Salius Diversus*, in his Treatise of the *Parts affected*, *Chap.* 16.) in some the Colour is much inclining to be red, in others yellow, and in a third sort, white. The swelling is now and then of a considerable bigness, and somtimes again it scarcely appeareth. And as for the pain, it is somtimes indeed very troublesom, but yet not so but that it may well be born; but then at other times (according to the Humor, the cause thereof) it is most sharp and intollerable. And then again, this pain is somtimes soon gone and vanished, but that continueth a long while. But oftentimes also divers evil Symptoms do follow, as an extraordinary great heat and burning in the place affected. But somtimes again, either there is present no heat at all, or on the contrary, there is a coldness that greatly troubleth the party; some of these persons being offended by the Air when it is over hot, and others by an Air too cool. The way and course of Curing is somtimes also very various, because in some of these such Medicaments as heat are found to be most beneficial, and in others those benefit most that cool; the pains in those being the more enraged by things that are cold; but in these they are heightened by such things as are hot. And then again, some of these pains are appeased by the Evacuation of the Blood, some by the purging forth of Flegm, a third sort from the emptying forth of the Choler, and the last kind of them by the Evacuation of Melancholly are very much mitigated and allaied. All which seemeth to denote thus much unto us, that the cause of the *Arthritis* is somtimes hot, and now and then cold and somtimes, the matter thereof very various and different.

But these Reasons do not sufficiently prove that which they ought. For although that (according to the various treasuring up of Humors) divers kinds of Humors may flow unto the part affected; yet these are not the prime and principal cause of the *Arthritis*, but together with the *Serum*, or Whey, they are forcibly carryed unto the part affected; or else they are drawn thither by the pain. And that that Humor which breedeth the swelling is not the principal Cause of *Arthritis*, appeareth even from hence, that in the beginning before the part swelleth, the pain is most intense, and violent, but as the part by degrees swelleth up, so the pain more and more remitteth. Neither indeed is this opinion agreeable to the truth. For many there are who although they be troubled with a Plethory and Cacochymy, yet notwith-

withſtanding they are not at all taken and ſeized upon by the *Arthritis*. And in ſpecial, (as for what concerneth the Blood) it doth not at any time any manner of way generate the *Arthritis* by its abundance. For the blood is the Treaſury of Nature; and therefore although it doth abound, yet nevertheleſs Nature doth not eaſily and upon all occaſions expel it unto any part whatſoever, but more eſpecially thoſe parts that are void of blood, ſuch as they are that are affected in the *Arthritis*. And then again, if the blood ſhould alſo happen to be driven forth thither, ſeeing that it is milde and harmleſs, it could not poſſibly ſtir up ſo great and vehement pains; which yet are alwaies preſent even in the beginning of the *Arthritis*, before ſuch time as the part begin to ſwel, and grow red. And if the *Arthritis* were from the blood, why ſhould not the Tumor then be ſuppurated; ſince that there is no Humor ſo eaſily brought to a ſuppuration, and converted into *Pus*, as is the Blood?

whether the blood may cauſe the Arthritis.

And as for Melancholly, the Caſe is likewiſe very plain; and there are but few that will have this Humor to be the cauſe of *Arthritis*: for it being a very thick and dull Humor, it cannot eaſily inſinuate it ſelf into thoſe moſt ſtreight and narrow paſſages.

whether Melancholly may be the cauſe of Arthritis.

But as for Choler, there are ſome who upon very good ground will have the *Arthritis* to proceed from it alſo, and not only from the flegm; and this they endeavor to prove even by thoſe very ſigns that appear in the *Arthritis*. For the pain is for the moſt part extream ſharp and violent; and not unlike unto that pain that is pricking and ſhooting; and the Diet that went before was dry and hot; or at leaſt, very much tending thereunto: the excerciſes alſo were over-violent; and the habit of the Body thin and ſpare. And the very truth is, that this is not indeed to be denied, that thoſe things do ſomtimes befal the ſick perſons; and that oftentimes alſo the pain is ſo ſharp, that it cannot poſſibly by any meanes be referred unto that Crude Humor Flegm, but argueth rather a hot Humor. But now a Queſtion may be here made, whether or no every preternatural hot Humor may be called Choler; and we think that we may well deny this to be a truth: and we determine with *Carolus Piſo*, that there may be a Serous or Wheyiſh Cacochymy, (although he doth not rightly explain it) and that there may likewiſe be a Serous Humor that may be moſt hot; and that under it there may alſo be comprehended thoſe ſharp *Ichores*, (of which we find *Hippocrates* and *Galen* making mention, and of which we ſhal have occaſion to ſpeak more anon) or if you had rather ſpeak as do the Chymiſts, that Tartarous Salt, or the ſpirits of Tartarous Salts. Neither are all that are troubled with the *Arthritis* of a thin and lean, or ſlender conſtitution of Body, and a Cholerick Conſtitution and temperament.

Fernelius (in his 6. *B. of the Diſeaſes of the parts*, and the *Symptoms*, *Chap.* 19.) rejecteth all the other Humors; and he there determineth, that not blood, nor Choler, nor Melancholly, but only the cold pituitous or Flegmatick, and Serous Humor, may be the Cauſe of the *Arthritis*; and that every *Arthritis* is cold, and proceedeth from a cold Humor. And in this indeed his Opinion is right and agreeable to the truth, that of one Diſeaſe there is but one only cauſe; but in this he is very much miſtaken, when he tels us that this Humor is cold; ſince that almoſt all the Symptoms that befal Arthritick perſons teach us the Contrary; to wit, that moſt acute and ſharp pain, burning heat, ſudden motion, and the reſt of them. For although when this Humor firſt beginneth to be moved there may ariſe ſome kind of coldneſs, by which the whole Body may be extreamly Chilled, and made to ſhake; yet notwithſtanding this is no ſure and certain ſign of a cold matter; ſince that even the hot Humors alſo (when they are moved through thoſe parts that have their ſenſe and feeling) may by little and little produce a coldneſs, or chilneſs, and horrour; as it is alſo very manifeſtly to be ſeen in Cholerick Feavers. And then Secondly, he erreth likewiſe in this, that he accounteth flegm and the Serous Humor for all one Humor; as likewiſe in this, that he will have the Serous Humor to be ſimply a cold Humor. For albeit that in the Serous Humors there are many parts that are wateriſh; yet there are alſo many parts therein that are ſharp and Salt, by which it differeth from ſimple and pure Water.

whether or no, Flegm according to Fernelius may be the Cauſe.

But *Fernelius* ſeemeth to have taken this his Opinion from *Galen*, (in his *tenth Book of the Compoſit. of Medicaments according to the place*, and 2 *Chap.*) where he writeth, that the Humor which exciteth the *Arthritis* is ſomtimes indeed the Blood;

blood, but for the greatest part a Flegmatick Humor, or mixt Humor, partly Flegmatick and partly Cholerick, or likewise of the blood mingled together with those aforesaid. Or if any one would speak more exactly as concerning it, he may say that it is not a flegmatick humor, but that the Humor which most an end is called Crude and undigested, and is for the most part predominant about the Joynts, is now and then very thick, and like unto the thicker sort of *Pus*: but when it hath for a while continued in the joynts, it is then rendered not only more thick, but also viscid and clammy.

There are very many other Physitians that in this follow the Opinion of *Galen* and *Fernelius*; and they account the Flegmatick, Cold, Crude, and Serous Humor, for one and the same; and withal they teach us that it is the cause of *Arthritis*. But in this they are al of them mistaken; seeing that neither can so sharp a pain proceed from such a cold and crude humor; and because that the *Arthritis* invadeth the sick person suddenly; and then oftentimes lieth hid again for a while, and is removed into another place; for the doing of which the thick and dul flegmatick humor, and that humor likewise that so neerly resembleth thick *Pus*, is altogether unfit. And moreover, seeing that even in the very beginning (when there is no swelling as yet appearing) the pain is most vehement and exquisite, this is sufficient to shew that it is caused by a humor both subtil and sharp (and this also penetrating into the most streight and narrow passages, and pricking the Membranes) and that it proceedeth not from any thick and cold humor. Neither do those *Tophi* that are generated in Arthritick persons sufficiently evince that Flegm is the cause of *Arthritis*, because that those *Tophi* or hard knots before spoken of do rather proceed from a humor that is Tartarous and neerly allied unto Earthy Minerals, than from a crude and raw flegm. *Thomas Erastus* indeed (in his fourth Disputat. against *Paracelsus*) writeth that he never but once saw the Gout bred from a pure and meer flegm; and this was in a certain noble person of *Helmstadt*, who was sick without any pain at al, if he kept but his hands and feet quiet: there was no redness to be seen; but a white swelling loose enough; although that his joynts were not without hard knots, but had many of them, and that for many yeers before he had not been able to stand upon his feet. But that Affect at this time was not indeed the Gout truly and properly so called, but only an *Oedematous* tumor, with the which the feet (by reason of a long and lasting afflux of the humors) were much troubled. But now that in the very beginning the blood with the flegm (or rather indeed a serous humor) flowed down into the Feet, and corrupted them, this is confessed even by *Erastus* himself.

Whether or no the serous filth be the cause of Arthritis, according to Piso?

Carolus Piso (in his B. of Diseases from a Wheyish filthiness, in two of his *Consilia* touching *Arthritis*) will have the serous and wheyish uncleanness to be the one only cause of *Arthritis*. Which Opinion (if it be rightly explained) is absolutely true and undeniable. But in this he is deceived, that he thinketh this *Serum* or Whey to be a pure Water; since that we are taught far otherwise by the symptoms, and those things that befal Arthritick persons.

Whether flegm mingled with choler, according to Mercurialis?

But others there are and (among the rest *Mercurialis*) who both knowing and acknowleding that such vehement and grievous pains cannot possibly be excited from a flegmatick and crude humor (in regard that it is certain that those most vehement and wracking pains are from a hot cause) and that likewise the flegmatick and crude humor is altogether unfit for so quick and sudden a motion as we see to be in the *Arthritis*; and that it cannot possibly insinuate it self into those Membranous parts; they therefore take the latter of the two Opinions in the place alleadged out of *Galen*, and determine that the *Arthritis* hath its original from Flegm mingled with Choler; and that the Choler is mingled together with the thick and tough flegm, being unto it as a Vehicle, or Conduit-pipe, for conveyance. But yet neither doth this Opinion satisfie us, unless that mixture of Flegm and Choler be understood of the serous or wheyish humor. For seeing that they themselves do acknowledg that so fierce and cruel a pain doth require a hot cause, this cannot therefore be from Choler mingled with Flegm, since that flegm doth dull and blunt the acrimony of Choler, rather than increase it.

Whether crudity according to Mercatus *may be the cause?*

Ludovicus Mercatus whilest he acknowledgeth, that the vitious humors (although they abound in the Body) do not presently generate *Arthritis*, but even other Diseases; therefore he betaketh himself unto a Crudity also; and thereupon determineth that the vitious humors ought to be Crude and undigested, before they can generate the *Arthritis*. But then when he would again acknowledg, that a Crudity is not simply enough and sufficient for the generating of *Arthritis*, he feigneth and inventeth divers things as touching Crudity; and determineth that that Crudity alone is fit for the generating of *Arthritis*; which proceedeth

proceedeth from the rarity and thinneſs of the heat (now whether or no he here ſpeak properly I leave it unto any mans Judgment) and that it is done three manner of wayes: Firſt of all, when the fatter part thereof is ſeparated and drawn out from it. Secondly, by reaſon of its diſſolution from an Exterual heat. Thirdly, becauſe that it hath mingled with it ſomwhat that is unconcocted, but hot. And yet notwithſtanding at the length he concludeth, that this Crudity of the humors is not any ordinary kind of humor, ſuch as the reſt are that procreate and beget Feavers, Defluxions, and many other Diſeaſes; but that it is a Crudity which obtaineth ſomthing that is peculiar and proper unto it, by reaſon of which it more inclineth unto, and ſooner cauſeth this Affect than any other: and this (as he tels us) is then done when the humors are made more thin by their being poured all abroad, and likewiſe by their mordacity and corroding quality; by which they are eaſily ſeparated from, and rejected by all the other parts, until they come to the Joynts. In this indeed he rightly and moſt truly aſſerteth, that that humor hath ſomwhat in it that is peculiar, by which it generateth the *Arthritis* and no other Diſeaſes. But now, if we well and exactly weigh and conſider this Crudity, or rather the Condition of the humor (as he calleth it; but yet every humor that is preternatural may not rightly be called Crude) moſt certainly agreeth with the ſerous, ſalt, and tartarous humor before mentioned and deſcribed by us; as ſuch which is thin, biting, poured abroad, or (as the Chymiſts ſpeak) reſolved by the tartarous ſalt. So that *Mercatus* ſeemeth to have underſtood the thing wel enough, but yet was not able wel to expreſs himſelf in words, as concerning it.

whether a humor malignant and of an occult quality may be the cauſe according to Paræus?

Ambroſe Parry (in his 17. *B.* and 2. *Chapter*) whenas he himſelf likewiſe took notice that the humor which generateth the *Arthritis* was a nature altogether different from thoſe that are the Authors of the *Phlegmone*, *Oedema*, *Eryſipelas*, or *Scirrhus*, he for his part determineth, that the nature of this humor was neither better nor worſe, but the very ſame with that from whence the Plague, French Pox, or the Epilepſie have their Original; and this he endeavoreth to prove: 1. Becauſe this humor never cometh to a ſuppuration, as do all the reſt of the humors. 2. Becauſe that it produceth pains far more ſharp and bitter than the other humors; inſomuch that the ſick Perſons often complain that they feel the part affected to burn as they think. 3. Becauſe that it is changed into hard knobs or knots, which doth not happen unto any other of the humors. 4. becauſe that it wil very hardly give place or remove for any Remedies whatſoever; but is rather more ſtird up, exaſperated, and enraged by them; ſo that the Patients are ready to tell us, that it is far better with them when they are without any remedies at all than when they have them applied. 5. Becauſe *Galen* himſelf (in his *B.* of *Theriaca* to *Piſo*, *Chap.* 15.) ſaith that Treacle is very uſeful for all Arthritick Perſons whatſoever, as that (in *Paræus* his Opinion) which dulleth and blunteth the malignity of the humor. In this indeed *Paræus* his Opinion is right, that the common ordinary humors (Choler, Flegm, and Melancholly) do not produce the *Arthritis*, but that the humor which is the Cauſe of the *Arthritis* doth obtain and hath in it ſomwhat that is proper and peculiar, and this is ſufficiently proved by the Reaſons above alleadged by him: but indeed there is no need at all that we ſhould here have recourſe unto any peculiar Malignity, and occult quality; neither do the Reaſons alleadged prove it. For there appeareth here nothing that is Malignant; but the vehemency of the pain proceedeth from the Acrimony of the humor; the which happeneth likewiſe ſomtimes in the pain of the Teeth, Ears, and other parts. And although that *Galen* commend Treacle as good againſt the *Arthritis*; yet this doth not at all argue, nor make that it ſhould ſubdue the Malignity of the humor, but rather that it ſhould conſume the vitious humors; and many other Medicaments of this nature are alſo before propounded, in the Cure of the *Arthritis*. But yet in the mean time we do not deny this, that the humor (which is the cauſe of the *Arthritis*) may ſomtimes likewiſe obtain a peculiar Malignity; like as we ſee it to be in the Scurvy, and the *Polonian Plica*. And yet notwithſtanding we ſay, that it doth not produce the *Arthritis*, as it is a Malignant humor, but as it hath that diſpoſition which other humors alſo (exciting the *Arthritis*) do obtain; that yet are altogether void of any the leaſt Malignity.

whether the Ebullition of Synovia, and a ſalt Spirit, according to the Chymiſts, be Cauſe of Arthritis?

And laſtly, (that we may likewiſe a little conſult the Chymiſts) we do indeed very much expect and hope for ſome light to be given us by them, for the clearing up of the point now in controverſie. But we ſhal hardly get any the leaſt light or ſatisfaction from *Paracelſus* and his followers, who for the moſt part even obſcure the plaineſt truth. For *Paracelſus* (as he is wont) ſpeaketh very variouſly touching the thing in queſtion: For in his Tract touching the *Podagra Gout*, pag. 540.) he there ſaith that the Gout is a diſeaſe, the ſeat whereof is *Synovia*; which when it is exalted, the Gout is then excited: And that the diſeaſe

disease is a Mineral liquor, or a sowr juyce, such as are, Allum, Vitriol, Vinegar, Barberries, Acacia, and the like; for seeing that these Salts are contrary and opposite unto the *Synovia*, if they be generated in any man, and mingled together with the *Synovia*, they then cause the *Synovia* to boyl over: and then he afterwards tels us strange and wonderful things touching the influence of Heaven (which here I scarcely think worth the relating) as likewise those things which he hath in his 2. B. of the Gout. In his *Paramirum* he referreth this Disease to Mercury precipitate: But in his B. of Tartarous Diseases, Chap. 19. he referreth it unto Tartar. *Petrus Severinus* (in his *Idea Medica, cap.* 12.) teacheth us, that the excited Roots of these Podagrick Affects, if they have their seat in the blood, they boyl up with heat, and send spiritual and vaporous Tinctures unto the Domestick places; and that the Matrixes of the Roots having there rotten fruit, do by a dolorous calamity of the Symptoms absolve the revolutions of the Predestinations. But the truth is, the differences of the pain (that I may in plain and easie terms shew you what he by an affected pomp of words obscureth) do all of them proceed from a diversity of the Salts, of which some are more, and some less sharp and biting: but that these spiritual and vaporous Tinctures are received by their Matrixes, (that is, those parts that are obnoxious unto the drawings out of the Podagrick fruits, when they are resolved; and they have in the general an affinity with them, and therefore readily admit of, and give entertainment to the guest coming unto it) to wit, the joynts, or the *Synovia* of the Hands and Feet.

But here they do by their words obscure a thing that is in it self most plain, and they likewise mingle falsities with truths. For as for what they bring touching the Ebullition of the *Synovia*, and the fervent boyling heat thereof, this *Synovia* of *Paracelsus* is a meer fiction and invention of his own; touching which we have already spoken in our Tract. *de Consens. & dis. Chymicor. cap.* 15. But as for what they speak of the salt Spirits, this (if it be rightly explained, and wel understood) is very agreeable unto the truth, as we shal shew you by and by. And so likewise we may wel enough bear with them in this, that they endeavor to explain the differences of the pains in Arthritick persons from the differences of the Salts that appear in Vegetables and Minerals; in regard that our own ablest Physitians (and among the rest, that most experienced *Felix Platerus*) are al of Opinion, that the humor which is the cause of *Arthritis* is not simply a Water, but endued with a quality of a different Nature, and mingled together with the *Ichores* and Excrements of the Humors, by which it is rendered more vehement. And so we likewise judg this more fit to be rejected in them (which yet *Severinus* delivereth unto us in words too obscure) to wit, that the other excrementitious humors are moved unto other parts; and that the humor which is the cause of *Arthritis* hath in it a peculiar tendency unto the joynts; as we also shewed you above. And therefore (that we may at length conclude this controversie) it appeareth from what hath been hitherto said, that neither simply the blood, nor flegm, nor melancholly, nor yet a Water, is the neerest and immediate cause of the *Arthritis*. But when I have wel weighed al those things that befal Arthritick persons, and which cannot possibly be derived from the Humors (as is manifest by what hath been hitherto said) I cannot otherwise determine, than that a salt, sharp, subtile humor (and such as for the most part resembleth the nature of the fallow spirits, is the nighest cause of *Arthritis*. And now, let who wil cal it Choler, or Flegm mingled with Choler, or Salt, or Tartar, or what he please, he may do it for me, so that the thing be but rightly explained. I for my part shal make use of the word *Serum* or Whey, Salt, and Tartar, that so I may likewise by a proper and peculiar word explain a thing that differeth from Choler and the ordinary and common Flegm. But now that the *Serum* or Whey is not only a watery humor, even the Ancients have acknowledged; and *Galen* in the sixth of his *Epidem. Comment* 3. *text.* 33. writeth that the serous or wheyish blood is by *Hippocrates* and *Plato* called not only a Water, and watery humidity void of biting, but biting likewise and corroding; to wit, which resembleth the nature of the Sallow or Willow spirits; and therefore it is that it pricketh and biteth those parts that are so sensible and quick of feeling, and in these it exciteth most acute and intolerable pains. There is, to wit, in the Earth (out of which Plants grow, by which both Man and bruit Creatures are nourished) something that is salt, which answereth unto Minerals; and it may not unfitly be called the salt of the Earth; which yet notwithstanding is scarcely to be found pure and alone, but it is mingled together with other bodies; from whence divers kinds of Earths have their Original; and thereupon (according to the great variety of Soyls) it is very various and different; as Muddy, Clayie, &c. and then at the length in Plants and Animals it is called Tartar; and so it cometh to be transfused into men. But this, albeit that in Plants and Men it become in the many various Concoctions very subtile

The Authors Opinion touching the cause of Arthritis.

tile and volatile (if it be not ſuch before) as very manifeſtly alſo it appeareth from the Salt of Urine, and that at length it is mingled even with the blood it ſelf: yet nevertheleſs in regard that from the very firſt original of it it is altogether unfit for the nouriſhing of the body, and is (as *Hippocrates* ſpeaketh) wholly unſerviceable thereunto, at the length (unleſs it be forthwith, even in the firſt Concoction, expelled forth by the belly or afterwards evacuated forth by ſweats and Urines) it is treaſured up; and being burdenſom to Nature it is thruſt forth unto the Joynts (as having a certain kind of neer allyance with ſuch like matter) where by its acrimony it exciteth moſt vehement and grievous pains. Neither let any be hereat moved, and wonder that we ſay that this matter is one while ſpiritual, and ſomtimes alſo Tartarous, and ſo very fit likewiſe for the generating of thoſe hard knots which they cal *Tophi*. For (that I may ſpeak with the Chymiſts) ſpirits may proceed from bodies, and again bodies may be from ſpirits. This matter in its original, and while it was in the Earth, was a body, and ſomwhat as it were Earthy, and Mineral like: but it cometh afterwards to be attenuated in the various Concoctions both in Plants and Men, and ſo it is made as it were ſpiritual: which hath been acknowledged by many of *Galens* followers; and among the reſt, by *Cardanus*, who upon the 47. and 49. Aphoriſms of the ſixth Section, writeth that the *Matter*, to wit, the cauſe of *Arthritis*, is as it were a ſpirit. And *Lucian* in his *Tragopodagra* calleth it a violent and injurious ſpirit. And yet afterwards this thin humor or ſpirit, when it hath once gotten a fit place (to wit, the bones, and the places about the joynts) it again betaketh it ſelf into the body, and is there coagulated; like as it is a thing generally wel known unto the Chymiſts; and other ſalt ſpirits may again be coagulated, and return into bodies. And yet nevertheleſs if any one ſhal aſſert that there is likewiſe a volatile Salt in the very Earth it ſelf (which the Plants draw unto themſelves) this doth no way thwart or oppoſe this Opinion of ours; but the whol reſult of the buſineſs and Controverſie in hand cometh al unto one and the ſame concluſion.

Queſt. 7. *Where the Humor the cauſe of* Arthritis, *is generated, and by what waies it floweth into the Joynts.*

IN what place the Humor that is the cauſe of the *Arthritis* is bred, and by what waies and paſſages it floweth into the joynts, in this Phyſitians do greatly differ among themſelves: which diſagreement of theirs hath much hindered the Cure, and made it far more difficult than otherwiſe it would have been; and therefore not without cauſe is it that *Fernelius* (in his ſixth B. of the Diſeaſes of the parts, and the Symptoms, Chap. 18.) writeth that from the very ignorance of this thing the pain of the joynts hath hitherto been held and left for incurable, and called the ſhame and diſgrace of the Phyſitians.

We have briefly above given you our Opinion as touching this thing in Controverſie. But becauſe there are many (and thoſe ſome of them of the more able and learned Phyſitians) that are of another Judgment, and differ from me in their Opinion (as in this darkneſs of Mans mind it is generally wont to be even in the greateſt and moſt ſerious Controverſies) I ſhal not think it time miſ-ſpent, nor my pains il beſtowed, in laying before you (with what brevity I can) their ſeveral Opinions; and in the recital of them I ſhal weigh them accordingly.

And firſt I ſhal indeed begin with *Fernelius*; who aſſerteth that they are much miſtaken, who think that the Humor the cauſe of *Arthritis* doth break forth of the more ſecret and inmoſt parts of the body into the Joynts. *For how* (ſaith he) *is it poſſible that any pure and ſincere humor can from the bowels, and the moſt inward ſeats be carried through the Veins; or that that humor which was ſo lately mingled with the blood ſhould now* (*without any mixture thereof*) *by the Orifices of the veins fall pure into the blood; or if there ſhould alſo together with the humor flow forth any of the blood, which being collected and gotten together in the Joynts doth it not excite a Phlegmone? And why likewiſe doth not the crude humor which is carried into the Joynts by any other paſſages than by the Veins cauſe the* Arthritis? *For in the Cachexie, the crude humors that from the bowels fall down into the feet, and cauſe them to ſwell, do not yet excite the Gout in them.* But even *Fernelius* himſelf taketh it for granted, and plainly aſſerteth that the Head is the Fountain and Original of this Malady, from whence (ſaith he) a flegmatick humor (and this very thin) floweth forth into the Joynts. And this humor (as he tels us) is not indeed gathered together in the Brain (as whoſe excrements are either purged forth by the Noſtrils, or elſe by the Palate fall down upon the great rough Artery, and the Lungs, or elſe into the Stomack, and the more inward ſeats) but it is (ſaith he) collected in the external parts of

the Head, and such as are placed without the Skul, and by the top and superficies of the body run along downward under the Skin. For seeing that there are many Veins running forth thither that are derived from the external Jugular Veins, he conceiveth that they may there lay up their thin and serous excrements; and that in regard the Skin of the Head is thick and impenetrable (so that the humors cannot easily expire and breath through the same) that therefore in progress of time they are there stored up, and from thence by the superficies and outside of the body fall down into the joynts.

There are very many other Physitians that follow this Opinion of *Fernelius*; of the which some of them wil have the humor (the Cause of *Arthritis*) to be collected in the Head alone, betwixt the Skul and the Skin of the Head; and they tel us that is the one only place from whence the matter floweth down unto the Joynts: but there are others of them, who although they likewise add other waies, yet notwithstanding they do withall joyn this way of *Fernelius*: and there are very few or none of them, who do not believe but that this matter doth withall flow down likewise from this place of the Head.

But in very truth, what *Fernelius* complaineth of touching the other Opinion (that by reason of it it so came to pass that the Arthritis was almost left as a desperate and incurable Disease, and was termed the *Opprobium* or disgrace of Physitians) I conceive (without disparagement unto any mans Judgment) that it may more truly be affirmed of this his own Opinion; and I am of Opinion that that Physitian who seeketh for the Spring and Fountain of this Malady in the Head only (neglecting in the mean time the true Fountain and fourse thereof) is scarcely ever likely to cure the *Arthritis*. For albeit it be indeed true, that certain various flitting and wandring pains may be here and there excited by the serous humor falling down from the extenal part of the Head under the Skin, by the outside and superficies of the Body; yet notwithstanding the *Arthritis* is never from hence generated; neither is that matter wont to subsist about the Joynts, but for the most part about the membranes of the Joynts. But now the generating of the humor that is the Cause of the *Arthritis* is very different, and of a far other nature. For this is generated in the sanguification, by reason of the Errors in Diet, and the weakness of the Bowels: and somtimes likewise it is supplyed from the suppression of the Courses in Women, and the sudden stoppage of the Hemorrhoids in both Sexes; and then it is heaped up in the Veins and Arteries: whereupon also so soon as ever it beginneth to be moved, and to become as it were boyling hot, there is almost alwaies a Feaver joyned with the *Arthritis*: yea and somtimes the Feavers are terminated in the said *Arthritis*; and hence it likewise cometh to pass, that in the *Arthritis* the Urine giveth forth most sure and manifest signs and Tokens of the humor that is peccant in the Veins. And hence it is that *Galen* himself teacheth us (in the third Section, Aphorism 20.) that in little swellings and pains of the Joynts, the deeper parts of the Body are throughly purged, the vitious humors being thrust from the more principal parts unto the outside and superficies of the Body: Neither can there any thing else be proved by firm and sonud Reasons. Al which being true as is alleadged, and the case standing thus; and it being most undeniable, that the Humor the cause of the *Arthritis* is contained in the Veins and Arteries, there can no reason be rendered of any necessity (either in Nature, or else in the Disease) why these Humors ought necessarily first of al to ascend up into the Head before they be carried into the Feet; in regard more especially that there is an open and strait way by which themay be moved through the Veins and Arteries, and so carried into the Joynts. And that the matter, the cause of *Arthritis*, is carryed unto the Joynts through the Vessels and not without them, appeareth also even from hence, that the Veins in those joynts that are like to be invaded by the *Arthritis*, swel up and grow big when it first beginneth; and in that the Humor exciting the *Arthritis* (if Repelling Medicaments be unseasonably applied) runneth back again into the Veins and Arteries; and is either transmitted unto the Noble parts, and there exciteth Acute Feavers, anxieties of heart, and other dangerous and deadly Symptoms; or else it is suddenly conveyed into another joynt; whereupon the pain which but ere while infested the Foot, instantly, (if Repellers be unadvisedly administred) thrusteth it self forth and appeareth in the hand; which could not be done, were it not that the Humor were moved through the Vessels. For it is not at all possible that the Humor which but just now was in one of the Toes, should under the Skin be so suddenly carried up into the hand. And if the Humor should in some space of time mount up thither under the Skin, yet it must of necessity cause pain in all those parts through which it passeth, as we may often take notice in those pains that arise from the Serous Wheyish Humor descending without the Skul, that the pain is first of all in the Head, and then afterward it is excited in the Neck, and then in the shoulder

blades,

blades, and the back; and that at the length both the Humor and the pain deſcend even unto the Thighs; which doth not at all happen in the *Arthritis*. And moreover it oftentimes cometh to paſs, that a man by wrath, or fear, is ſuddenly caſt into the *Arthritis*; which happeneth moſt certainly from the Humors being ſuddenly moved in the Veins and Arteries: but if the Head ſhould have theſe Humors ſenſibly and by degrees heaped up in its own Skin, this could no waies happen. And again, if the fountain and original of this Malady were under the skin of the Head, why is not then the Cure chiefly directed to that ſeat, and why are not veſicatories, Cauteries, and iſſues applied unto the Neck; ſeeing that there is ſcarcely a fitter place then this to be found, whereby the matter gathered together betwixt the Skul and the Skin of the Head may be evacuated. And furthermore, if the Original of the Humor were alwaies in the external part of the Head; then of neceſſity there would be preſent likewiſe ſome ſigns thereof heaped up there, and deſcending; which yet in the moſt are not at al taken notice of, their Heads being altogether ſafe and ſound when yet their Joynts are invaded by the *Arthritis*. *Fernelius* indeed among other the ſigns of the Humor heaped up, reckoneth the heavineſs of the Head for one, as alſo overmuch deſire of ſleep, an external pain of the Head, and which is ſtird up only by the touching thereof, (eſpecially if the hairs be kembed back but never ſo little) an Oedematous wateriſh ſwelling, like unto ſoft wax, lying under the Skin, more eſpecially in the hinder part of the Head: but he reckoneth up for ſigns of the Humor flowing downward, a pain running up and down from the Neck, or by the ſhoulders, into the Arm and Hands; or elſe turnd down by little and little along the back into the Hips, Knees, and feet, there ariſing ſomtimes ſome kind of ſenſe and feeling of Cold. But indeed it cannot at all be denied, that theſe ſigns are preſent, when there is a Serous and Wheyiſh Humor heaped up together in the Head, and falling down by the external parts of the Body: but they very ſeldom appear in the *Arthritis*; it being moſt manifeſt by experience, that ſuch as are troubled with the *Arthritis* are yet for the moſt part very wel in their Heads. Neither do ſuch as are taken with the *Arthritis* alwaies perceive that deflux of Humors from the Head, and the pain proceeding therefrom, as but even now we told you. And grant indeed that it be ſo, that in the beginning of the *Arthritis* the head may likewiſe in ſome (where it is but weak) be offended, and that there may be a kind of heavineſs and pain perceived therein, Yet nevertheleſs neither doth this ſufficiently prove that the Humor (the cauſe of the *Arthritis*) is generated in the head, (in regard that the very ſame often happeneth in Feavers, although the cauſe of the Feaver be not generated in the Head) but the head is therefore offended by its conſent with other parts. For when the Humors boyl with heat in the Arteries and Veins, and that they begin to be moved, they partly rove and run up and down by their own impetuous motion (this being proper unto them, when they abound and ſwel up) and partly they are by Nature thruſt forth hither and thither; and then they more eſpecially flez upon the weak parts, until at the length they ſeat and fix themſelves in one certain place. And therefore it is not at all to be wondered at, that in ſuch perſons as have weak Heads, and heads that are otherwiſe very ſubject to excite defluxions, in the firſt invaſion of the *Arthritis* ſome of the Humors (now about to ruſh forth unto the Joynts,) ſhould be poured out by the Capillary Veins under the Skin in the head, and there excite pain, and other Symptoms. Which yet notwithſtanding doth nothing at all patronize this Opinion of *Fernelius*, ſince that even thoſe very Humors are not bred and collected under the Skin of the Head, (as he would have it) but they are ſuddenly poured forth thither by the Veins and Arteries that are ſent unto the head from the external Jugular Veins and Arteries. And grant it indeed to be true, that the Arthritick pains properly ſo called were excited in the Neck, as he ſaith: yet nevertheleſs this is not done by the matter that by degrees is collected under the skin, and by little and little flowerh thither, but becauſe the humors are poured out thither through the Capillary Veins by which thoſe Joynts are nouriſhed. For like as thoſe humors are carried down to the Feet by the deſcending trunk of the great hollow Vein and Artery; ſo the ſame may be ſent upwards unto the head and the parts lying neer about it by the ſame trunk aſcending. And that there appeareth ſome kind of difference of the Symptoms in the ſick perſons, it happeneth from hence, that the humor floweth and is moved, ſomtimes by the trunk of the hollow Vein

and

and Artery aſcending, and ſomtimes by the ſame trunk deſcending (this being more uſual then the other) and now and then by both. For when it is moved upwards by the aſcending, before ever it cometh to the hands by the Axillar branches, ſomthing may eaſily be thruſt forth by the Jugulars (as well the external as the internal) aſcending up into the head, as alſo into the Brain, and under the Skin; where ſome of theſe ſick perſons may be infeſted with reſtleſſneſs and want of ſleep, and others of them with a drowſineſs, and exceſſive propenſion to ſleeping and ſlumbring, and others of them by other Symptoms. But that that Humor which infeſteth the Toes ſhould be collected under the Skin of the Head, or poured forth thither out of the Veins and Arteries, and from thence flow down unto the Foot, this cannot be proved by any firm Reaſon. For what is that right and ſtraight way by the which it may ſuddenly flow ſtraight down from the head, under the Skin, unto the Feet and Toes? For when the matter diſtilleth from the head under the Skin, it is diſperſed hither and thither; and here and there it exciteth pains; but it doth not tend directly and ſtraight downward unto the extream parts of the Feet: neither likewiſe if it ſhould flow down by this way, could it poſſibly (as oftentimes it happeneth) ſo ſuddenly aſcend up into the Hand, by changing its way.

And in ſpecial, as for what concerneth the exceſſive ſleepineſs and drowſineſs we oftentimes find in the ſick perſon, (and if there be any other Symptoms of this kind, that ariſe even in the very brain it ſelf) theſe do neither appear in every *Arthritis*; neither if they ſhould appear, would they at all confirm the Opinion of *Fernelius*, but rather confute it, as teaching us, that the matter is not generated and moved without the Skull, but that it is poured forth of the very Veins themſelves. For this ſleepineſs and drowſineſs is cauſed from the matter that is heaped up within the brain, and not collected without the Skul; which if it be preſent in the *Arthritis*, it teacheth us thus much, to wit, that there is likewiſe ſome matter by the Veins and Arteries poured forth into the brain it ſelf.

And Laſtly, it is manifeſt alſo by experience, that even other Diſeaſes (and eſpecially ſuch as are acute, whoſe matter ſticketh in the Veins, and about the Bowels) are changed and turned into the *Arthritis*; and then the thick Urins are a ſign and argument of the *Arthritis* nigh at hand. And *Averroes* (7. *Collig. Chap.* 3.) teſtifieth that he himſelf became *Arthritick* from an acute Diſeaſe, when Nature by the Criſis had driven forth the Humors unto the Joynts, and eſpecially unto the Feet; which had not been, if the *Arthritis* were generated from a matter flowing down from the Head: touching which we ſhall likewiſe ſpeak more hereafter, when we come to examine the Opinion of *Platerus*.

Neither are thoſe things of any great moment that *Fernelius* bringeth againſt the other Opinion, which we mentioned above, and conceive to be very agreeable to the truth. For when he demandeth, how a ſincere humor can flow unto the Joynts by the orifices of the Veins, he calleth that in queſtion which we may every day ſee done in perſons that are ſick. For Nature reteineth the blood as the treaſury of life; and leſt that it ſhould be defiled and corrupted by the vitious humors, it expelleth them divers waies out of the Veins and Arteries. And certain it is that in the fluxes and Purgations of the belly it thruſteth forth the vitious humors alone out of the *Vena Cava* (or great hollow Vein) unto the Meſaraicks, and from thence unto the Inteſtines: and by Critical ſweats it expelleth the vitious Humors (and theſe indeed ſomtimes ſincere, but moſt commonly ſtinking and of a very ill color) by the orifices of the Veins ending and terminated in the Skin. And the ſame it doth in the Eryſipelas, Scabbineſs, ſmal Pocks and Meaſles, and many other Diſeaſes; in which Nature (that ſo it may preſerve the Body ſafe and ſound) ſeparateth the vitious humors from the good blood, and expelleth them by the Orifices of the Veins. And yet notwithſtanding neither doth that Serous humor alwaies flow ſincere unto the Joynts, but oftentimes it likewiſe carrieth forcibly along with it the blood, and many times alſo other humors. But as for what *Fernelius* addeth, that if the blood ſhould flow forth together with the ſaid humor, it muſt neceſſarily excite a *Phlegmone*, this indeed often happeneth as he himſelf confeſſeth, whileſt as touching the *Chiragra*, or Gout in the hand, he thus writeth: *There is* (ſaith he) *in this affect a beating pain, with a Swelling, Redneſs, Heat, and for the moſt part with ſwoln and ſtrutting Veins.* And touching the *Podagra*, or Gout in the Feet;

there

there is (ſaith he) *a ſwelling preſent here like as in the* Chiragra; *as alſo a Redneſs, Heat, and beating pain both in the part, as alſo in the Veins lying round about it*: al which are ſigns of an Inflammation. Whereupon likewiſe it is that *Hippocrates* (in the ſixth Section of his Aphoriſms, Aphor. 49.) attributeth this name unto the Arthritis, when he ſaith that ſuch as have the Gout are troubled likewiſe with a *Phlegmone*. And yet nevertheleſs every Inflammation is not neceſſarily ſuppurated; and that in the *Arthritis* the humors are not ſuppurated, this ſheweth not unto us the place from whence they flow forth, but rather argueth the Nature of the humor it ſelf, as being altogether unfit for ſuppuration; to wit, ſuch as is ſerous, ſalt, and tartarous; the thinner part whereof is diſcuſſed, but the thicker part thereof that is left behind is converted into hard knobs or knots. For there is nothing ſuppurated but the blood, or that which partaketh of the nature of blood, and hath ſomthing thereof mingled together with it.

Neither yet doth this likewiſe prove that the humor deſcendeth from the head, to wit, that this Diſeaſe doth ſomtimes invade the party with a ſhaking and trembling, or at leaſt with an ordinary and ſlight kind of Chilneſs and Cold. For this quaking and cold is no ſign at al of the humor deſcending from the head under the skin, but rather of the humors being poured forth out of the Veins, like as we ſee the very ſame to happen in feavers, and the *Eryſipelas*.

Others alſo there are (as *Euſtachius Rudius*) who think indeed that this matter floweth down from the head; but then that it doth flow unto the Joynts, not only without the Skul, (between the Skin and the pericranium, by the ſpaces that are under the Skin) but that it deſcendeth within the Scul alſo, by the extream ſuperficies of the ſpinal Marrow: others there are alſo that tell us, how that it floweth down through the very middle of the ſubſtance of the ſpinal Marrow. But if it were thus, as they ſay, there ſhould rather a Palſy or Convulſion be from thence excited; and in the middle ſpace (by the which the humors ſhould flow) the Nerves ſhould likewiſe be affected.

Others there are who Joyn both theſe Opinions together; and theſe tel us that the Humor doth partly flow from the head, and partly are conveyed through the Veins; and this is indeed the moſt common Opinion; which therefore *Platerus* is very large in the explaining thereof; who teacheth us that the Humors exciting the *Arthritick* pains may fal down either within or without the Veins. Within the Veins indeed, when the bloody humor cauſeth the hot *Arthritis*, (as ſome cal it) having the Feaver *Synochus* Joyned with it. For as by a ſubtile and thin blood poured forth into the ſuperficies of the Skin Eryſipelas's (that are accompanyed with the Feaver *Synochus*, or a continual Feaver) are excited; ſo likewiſe while it is poured forth into the ſeats of the Joynts, the pain of the Joynts (which the ſame feaver likewiſe doth accompany) is bred; ſo that indeed who ſoever they be that are Obnoxious unto both theſe Diſeaſes, when they are ſeized upon by the Gout, they may then comfort themſelves with an Opinion and conceit that it is no more then an *Eryſipelas*: All which things are indeed moſt true and certain.

And yet notwithſtanding he determineth likewiſe that the Serous or wheyiſh Excrementitious humors being heaped up together may excite the *Arthritis*; and that their Original is from the head, and that the Source and Spring of defluxions hath there its exiſtence, and that from it they flow down into the parts lying beneath: but that they are there ſomtimes heaped up together in its interior ſeat, betwixt the Skul, and the crude and impure Blood affording matter unto it. For then that part of it that is altogether unuſeful for Nutrition, and Excrementitious, is by ſome and ſome heaped up in the brain, which when afterwards it falleth down it then breedeth the pains aforeſaid; which are accompanyed with a heavineſs of the head, and ſomtimes with a great pain therein, and other accidents, the ſure ſigns and tokens of the matter there heaped up together. And he tels us that the Excrementitious blood is cauſed by the vice and errour either of the firſt, or the ſecond, or even of the third Concoction that is made in the brain; by reaſon, to wit, of ſome diſtemper or weakneſs therein. And withal he telleth us, that al this filth and excrementitious Humors that are heaped up in the head, do either by Reaſon of their too great abundance, when they are ſtirred to and fro, flow downwards, or elſe they are preſſed forth, and poured all abroad by the external cold and the moyſtneſs

of

of the Air; or elſe that they are ſtirred up by the heat of the Sun, of ſome Bath, the Pores and paſſages being opened, and the expulſive faculty provoked.

And yet he determineth likewiſe, that the very ſame ſerous and excrementitious humor may likewiſe be ſtored up without the Skul, betwixt it and the Skin, and that it may from thence flow down into the inferior parts.

But he teacheth us that the waies and paſſages (by which this defluxion is from the Head) are very various. As for the humor collected within the Skul in the Baſis of the Brain (conſiſting of three Cavities ending in the very bottom of the Skul) he tels us that it is ſomtimes ſtrained through by the hole of the Bone they call *Cribroſum* (bearing ſome kind of reſemblance with a Sieve) and diſtilleth out of the Noſtrils, and that it then exciteth that diſtillation we cal *Coryza*, or the Poſe: and that ſomtimes likewiſe it is carried into the middle Cavity, which is full of holes, and looketh toward the Palate; and that then it is either blown forth by the Noſtrils, or brought forth of the Jaws, and ſpit out by ſcreaming and retching; or that deſcending into the ſeat of the Eyes, it exſtilleth forth by tears: and that ſomtimes it followeth the conveyance of the Nerves in the midſt of this ſeat (of which ſome of them paſs through by theſe holes:) and that ſomtimes it being carried into the hinder Cavity of the Skul (which is lower and wider) it deſcendeth through the great hole (in the hinder part of the Head) of the Spinal Marrow, into ſome place of the habit of the Body; and that it ſtoppeth either in the fleſhy parts any where, or about the Region of the Joynts, and there cauſeth the aforeſaid pains of defluxions, or of the Joynts.

But as for the humor collected without the Skull, and flowing downward under the Skin (as it inſinuateth it ſelf either into the Joynts or the fleſhy ſeats) he endeavoreth to produce divers kinds thereof: all which he explaineth at large.

But in very truth, as we willingly admit of thoſe things that he produceth touching the motion of the humors without the Veins (in which he agreeth with *Euſtachius Rudius*) ſo we cannot be induced to believe that the *Arthritis* is generated from thence. For firſt of all, the matter that is generated in the Brain, and exciteth the *Coryza*, or abundance of ſpittle, and is caſt forth by the Noſethrils and the Jaws, it is of a far different nature from that which breedeth the *Arthritis*; and it could not poſſibly otherwiſe be, but that if a matter ſo ſharp and fiery, as it were, ſhould be generated in the Brain, it muſt needs produce moſt grievous ſymptoms. And moreover whether this humor deſcend according to the paſſage of the Nerves, or according to the conveyance of the Spinal Marrow, it could not be, but that it ſhould firſt of all in its paſſage cauſe either a Convulſion or a Palſey, or ſome kind of pain, before ever it could come unto the extream part of the Feet and Toes, and ſhould there excite pain; whereas notwithſtanding on the contrary we oftentimes ſee (and eſpecially in the beginning of this Diſeaſe) that there is ſuddenly a pain excited in the Feet, no pain at all, or ſymptoms elſewhere appearing. And furthermore I likewiſe willingly indeed grant that from the matter heaped up under the Skin of the Head the pains of Defluxions (as *Platerus* rightly calleth them, and diſtinguiſheth them from the Arthritick pains; although he be miſtaken in this that he determineth that theſe pains and Defluctions are only in the fleſhy parts of the Muſcles, whereas indeed they are equally about the Joynts) may be excited in the fleſhy places and Membranes of the Muſcles: but yet I cannot perſwade my ſelf that the *Arthritis* properly ſo called, returning by certain intervals, and having alwaies one time of duration, ſhould thence be generated. For if the humor ſhould fall down betwixt the Fleſh and the Skin, it muſt firſt of all ſeiz upon the parts nigh unto the Head, and upon the Joynts; ſeeing that (as *Galen* expreſly teacheth, in his 2. *B. of the Difference of Feavers, Chap.* 11.) thoſe fluxions that are from the Head are wont in the firſt place to infeſt the parts neer unto the Head, as the Ears, Eyes, Teeth, Gums, and the Glandules that lie next, or the Breaſt and Lungs, and the Muſcles of the Back; whereupon ſuch like pains from a Defluxion preſently in the very firſt beginning of the deſcent of the humor from the Head are perceived in the neck (before and behind) and in the Shoulder blades; but they ſcarcely ever deſcend into the Toes (which indeed are moſt of al infeſted by the *Arthritis*) that ſame thin ſerous humor vaniſhing by the way; which happeneth not in the *Arthritis*, in which the pains are wont firſt of all (and that very ſuddenly) to be excited for the moſt part in the very ends of the Toes. For what *Solenander* writeth concerning a certain noble perſon (as we may find it in the 24. *Conſil.* of his fourth Section) who being troubled with the *Arthritis* about the latter end of the Winter, had (as he ſaith) the humors therefore moved from the Head, becauſe they were not ſuddenly augmented, but encreaſed by little and little, and running from Joynt to Joynt, from Foot to Foot, and from thence into the Knee; and that from hence they aſcended and ſeized upon the Hands, and after this

inſinuated themſelves into the Joynts of the Elbow; this I ſay ſeemeth unto me a thing very improbable. For if the Humor had flown from the Head, it ought firſt of al to have infeſted the Elbows, and then the Hands; firſt the Knees, and then the Feet; whereas here the quite contrary was done. It ſeemeth more agreeable to truth, that this was done from the nature of the humor, and the great abundance thereof. For when it was more thick in the Winter time it is was moved the more ſlowly: but when once there was great ſtore thereof heaped up, Nature firſt of al drives it forth unto the extream parts, which when they could not poſſibly receive all of it, ſhe then afterwards thruſt it forth likewiſe unto the more neer neighboring parts. Neither indeed can I ſee any way, by which this humor heaped up without the Skul, ſhould be carried down ſtraight and directly unto the Feet, and not ramble and rove up and down, hither and thither, like as do thoſe pains from Defluxions. And be it ſo indeed that the Brain doth likewiſe ſomtimes ſuffer certain ſymptoms; and that the pain may firſt of all begin in the nook of the Neck, and may after this ſeiz upon the Shoulder, afterwards upon the Elbow, and laſtly, upon the Hand; yet notwithſtanding that is not at all yet proved which ought to be, to wit, that this humor deſcendeth without the Skul, betwixt the Skin and the Fleſh. For firſt of all how the Gout *Podagra* comes to be bred in the Feet, is not ſhewn in this manner. And moreover, albeit the humor flow within the Veins and Arteries, there may the very ſame ſymptoms be produced in the Brain (which could not at all be if the humor were moved without the Skul, under the Skin) and alſo the ſame pain in the Nook, Shoulder, and Elbow. For while nature is endeavoring to expel that vitious humor by the aſcending Trunk of the great hollow Vein, and Artery, there may very eaſily by the Jugular Veins and Arteries ſomthing flow into the Brain, which may there excite ſome kind of ſymptoms; and before ever it come ſo far as the Hands, it may eaſily happen, that Nature may by thoſe Branches that are diſperſed throughout the Nook and the Shoulders thruſt forth ſomthing into thoſe parts. And whereas all the Joynts in the whol Body, as alſo the parts that lie about them receive their nouriſhment from the Veins and Arteries, there is no Joynt in the whole Body into which likewiſe the humor (the Cauſe of *Arthritis*) may not flow in by the very ſame Veſſels, ſo that there wil be no need at all of ſeeking for blind and hidden waies and paſſages even from the moſt remote parts. And that I may in the laſt place likewiſe grant this, that it may poſſible be, that ſuch like ſerous humors abounding in the Veins may alſo be thruſt forth into the Head, and poured out under the Skin, and upon the approach of the Arthritick Paroxyſm, and Nature ſetting her ſelf upon the work of expulſion, they may likewiſe be moved, and by the Neck may deſcend into the Back: yet notwithſtanding theſe are not thoſe humors that breed *Arthritis*; but deſcending under the Skin, and pulling the Membranes in the outſide of the Body, they excite thoſe roving and flitting pains; yea and ſomtimes alſo they breed a ſpurious and baſtard Pleuriſie; but they are very eaſily taken away by fricions, diſcuſſing Medicaments, and Sweats, the *Arthritis* yet ſtil remaining.

Franciſcus India (a Phiſitian of *Verona*) in his firſt *B. of the Gout, Chap* 4. rendreth this thing very intricate, whiles he writeth that the members that ſend forth theſe ſuperfluities are various and very many, and eſpecially the Head, the Stomack, the Inteſtines, the Liv, and the Kidneys; and that thoſe Fluxions are indeed more eſpecially from the Head, and from the Brain; becauſe that although thoſe humors draw their Original from the Inteſtines, and from the Stomack and other Members, before they flow unto the parts of the Joynts, they firſt of al aſcend into the Head, and from it are afterwards tranſmitted unto the parts lying underneath it. But yet he doth not indeed deny that thoſe humors proceed from the whole Body. For if (ſaith he) the Body were altogether free from ſuperfluities, no humor would at al flow in. And yet nevertheleſs he denieth that the matter doth immediately flow from the whol Body unto the Joynts, ſeeing it cannot poſſibly be, that the humor which is found in the Stomack, or the Inteſtines, or in the Liver, or Spleen, ſhould ſo ſuddenly from theſe parts flow unto the Joynts, unleſs by the incitation of Nature it were driven forth by thoſe waies that lead unto the Joynts. Now he determineth that thoſe waies are the Veins, Muſcles, and Nerves. The Veins, to wit, that are deſtined for the nouriſhing of the Hands and Arms, do carry the excrementitious humors that have their exiſtence throughout the whole Body unto the Ligaments of the Fingers, the Tendons, and the Joynts. But the Muſcles that ariſe from the Shoulder-blades, and the very top of the *Spina* and that are implanted into the Shoulders do receive the ſame excrements from the inferior parts of the Body, and derive them unto the Ligaments of the Fingers. But as for that matter which floweth from the Head, Nature thruſteth it forth unto the Joynts of the Fingers by thoſe Nerves that deſcend from the Head. And yet notwithſtanding afterward he denieth that the humor is carried from

the Head alone unto the inferior parts of the Body; as for Inſtance, unto the Knees, the Thighs, and the Ligaments and Joynts of the Toes; but that by the conſent of the Veins and Nerves of the *Spina* or Back-bone, and by reaſon likewiſe of the conſent betwixt the Kidneys and the Knees, Thighs and Feet, it is ſometimes alſo carried from the ſaid *Spina* of the Back and from the Kidneys unto the Ligaments of the Knees and unto the Joynts of the Toes.

But in this Opinion there are contained many things that are falſe. For firſt of all, whereas it is ſaid that the matter floweth from the whol body unto ſome one place, we are not hereby to underſtand al and every part of the body, the ſtomack, the Inteſtines, the Liver, the Kidneys, and other parts, but only thoſe kind of parts in the whol body that are filled with Veins. For although that the excrementitious humors may be generated in the ſtomack, Inteſtines, Liver, and Spleen: yet when they are heaped up, they are then diſtributed into the great hollow Vein, as alſo into the Arteries, with that perpetual flux and paſſage to and again of the blood; and from hence they are thruſt forth unto the external parts of the body, as in the *Scabies* we may ſee, and ſo likewiſe in very many other Affects. And therefore if vitious humors be heaped up in Arthritick perſons, there is no need at all that they ſhould be derived unto the Joynts by ſo many turnings and windings, by the Muſcles, and by the Nerves; ſeeing that there is a neer and direct way through the Veins and Arteries, from which as al other parts of the body, ſo likewiſe the Joynts receive their nouriſhment. And furthermore it is no way agreeable to truth that the humors ſhould flow unto the Joynts by the Nerves: for neither do the Nerves eaſily admit of, and receive ſo great an abundance of humors; neither were it poſſible, if that matter were received by the Brain, and ſhould flow unto it through the Nerves, but that it ſhould firſt of al excite moſt grievous Maladies, before ever the *Arthritis* could ariſe and appear. *India* indeed ſeeks by al means to avoid al theſe inconveniences, whiles in his ſixt Chapt. he writeth, that the matter which floweth doth not fill the Nerves within; but only diſtend the ſame outwardly. But this is not to flow through the Nerves: neither doth he in this manner ſhun thoſe inconveniences, whiles he doth not ſhew us how by a continual paſſage from the Head (according to the progreſs of the Nerves) this matter may flow, ſo that yet notwithſtanding it may in its way and paſſage excite neither Convulſion nor Palſey, nor any other pain. And indeed to what end is there any need of thoſe ambages, and turnings and windings about (this way and that way) by the Muſcles; when (as we have already often ſaid) there lieth a direct and ſtraight way out of the Veins and Arteries into the Joynts?

Adrian Spigelius (in his B. of the *Arthritis*) hath a peculiar Opinion as being held by him alone: who when he would acknowledg that this afflux is altogether made by the Veins and Arteries, and yet nevertheleſs would not altogether deſert that Opinion which determineth that the humors flow down from the Head, and would withal give us notice, that that flux cannot poſſibly be either without the Skul, or within it, and ſo from the Brain; he therefore determineth, that the fluxion is both from the Head, and from the Liver: but then in this he diſſenteth from all others, that he teacheth us that the aforeſaid fluxion (which he conceiveth to proceed from the Head) is very ſeldom under the Skin (as *Fernelius* tels us it is) and never by the hole of the Spinal Marrow (by which the Spirits are kept together) or by the hole of the Nook, above the external Membrane of the Spinal Marrow; but that by the Veins and Jugular Arteries (not only the external, but likewiſe the internal, by the which from the lower parts, eſpecially the Liver, the humor is carried into the external and internal parts of the Head) it floweth back again into the great hollow Vein, and the great Artery, or its branches that have their exiſtence under the Throat; and that ſo from thence they are devolved into the Joynts.

And the very truth is, that *Spigelius* his Opinion is indeed right, That the flux of humors in the *Arthritis* is by the Veins and Arteries; which he might wel learn even from this, by obſerving that if before the univerſal evacuation of the body there be applied unto the Foot, or the Hand, any external repelling or cooling Medicaments, that then the matter flowed back unto the noble parts, and excited acute Feavers, and other Maladies. But that the matter doth from the Brain firſt of al regurgitate into the Veins and Arteries, this he doth not at al prove, but produceth it without any firm ground and reaſon. For on the contrary rather, thoſe things that happen unto Arthritick perſons do teſtifie that this humor is neither generated in the Brain, nor heaped up there, nor thence regurgitates into the Veins and Arteries; ſince that if this ſhould happen, a humor ſo ſharp as this is, and able to effect ſo great pains, muſt needs excite the moſt grievous Affects in the Brain. *Spigelius* here ſeeks for ſhifts, ſeeing that many things teach us that theſe humors are bred in the Liver and Spleen, the places

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and ſtore-houſes of Sanguification, and that from thence they are heaped up in the Veins and Arteries, and by them at length thruſt forth into the joynts; ſo that there is no need at al of deriving them from the Brain.

Some there are who determine that the humors are poured forth unto the joynts from the whol body. But theſe by the whol can here underſtand nothing elſe but the Veins and Arteries, diſperſed throughout the whol body.

But that we may at the length conclude this long and tedious diſputation, and contract it into a few words; this in the firſt place is certain, that the matter the cauſe of *Arthritis* is generated in the Bowels of the lower belly; yea, and that oftentimes it is long ſtabled up (as it were) about the Spleen the Inteſtines, and the Liver; until at the laſt it is transferred into the great hollow Vein. And *Mercatus* writeth moſt truly, that as he himſelf had ſeen when the pains of the joynts had ariſen from the pains of the belly; ſo he likewiſe found the ſame to be the Opinion of Authors none of the meaneſt; and I my ſelf have alſo obſerved it more than once in ſuch perſons as were Hypochondriacal, and ſuch as have had the ſcurvy: and from hence likewiſe it is, that *Diarrhæa* fluxes unſeaſonably ſuppreſſed are turned into the *Arthritis*. And that there may flow from the *Colon* Inteſtine a humor exciting the *Arthritis*, we are taught both by *Galen* and *Hippocrates* in 6. *Epidem. Com.* 4. *Text.* 3. And as for the waies and paſſages the thing is very plain (as we likewiſe told you before, touching the Scurvy:) to wit, that from the *Colon* this humor may by the Meſeraick Arteries be transferred into the Trunk of the great Artery, and from hence be thruſt unto the joynts.

And Secondly, This alſo is true and certain, (and that which is granted by all the moſt learned Phyſitians) that the Humor the cauſe of the *Arthritis* is moved through the Veins and Arteries (ſome of theſe ſay alwaies, but others of them very often, and they are thoſe that determine that the humor floweth down likewiſe from the Head) and the thing is altogether ſo plain, that *Thomas Eraſtus* (who notwithſtanding in his 4. *Diſputat.* againſt *Paracelſ.* Page 261. defendeth likewiſe another way from the Head) writeth, that he only can doubt of this thing who doth not ſufficiently attend, and take notice of what is dayly done, or he that hath his minde prepoſſeſſed with a prejudicate Opinion.

And ſeeing that theſe things are true and certain, the doubt now lieth in this, Whether this way be not ſufficient? and whether there may any other be aſſigned? and whether the humors alſo flowing down from the Head, under the Skin, may excite the *Arthritis*, yea or no? And yet notwithſtanding (in the third place) I conceive that this is alſo moſt true and certain, and ſufficiently proved above, that ſomtimes the beginning of the fluxion is not from the Head. For whereas both the part tranſmitting, and the part receiving, do both of them diſcover themſelves by their ſeveral and proper ſymptoms; and that in many Arthritick perſons there appeareth no heavineſs of the head, no pain, neither any other ſymptoms as ſigns and tokens of any humor gathered together and heaped up there; it cannot therefore be concluded that the humor floweth down from the Head. And moreover, neither hath that *Arthritis* which is from the Collick its original from the head, or from the brain, as before we ſhewed you: as likewiſe neither that which proceedeth from a *Diarrhæa* unſeaſonably and unduly ſuppreſſed. And therefore fourthly, this remaineth that may truly be doubted of, to wit, Whether or no the *Arthritis* may ſomtimes have its original from a matter heaped up under the Skin of the Head, and from thence flowing down? Which indeed very many of the moſt learned and able Phyſitians do affirm, whom I leave free unto their own judgments: but yet for my own part I cannot be perſwaded to beleeve it, for the reaſons before alleadged; which here to repeat, I hold it altogether needleſs, in regard eſpecially that I am able very wel to render a reaſon of al thoſe ſymptoms that befal unto Arthritick perſons; although I determine that the humor the cauſe of *Arthritis* is moved only within the Veſſels, and that by them it floweth into the joynts; eſpecially if this be well heeded, that this humor doth ſomtimes moſt chiefly flow through the deſcending Trunk of the hollow Vein, and the great Artery, and ſomtimes likewiſe that it withal floweth by the aſcending Trunk; and that from thence various ſymptoms are excited about the head. What need is there therfore that neglecting thoſe waies which Nature hath ordained as Channels for the motion and flux of the humors, we ſhould ſeek for unknown and unheard of waies? And there is one thing that I cannot but at leaſt touch upon; and it is this, That *Eraſtus* indeed (in the place alleadged) hath this for a ſure and certain ſign of the humor its flowing from the head, that the ſick perſons do for the moſt part manifeſtly feel and perceive the humor to flow down from the head, by the neck, ſides, and back, like unto a wa-

with a kind of ſhaking, trembling, or a ſlight kind of cold. But this ſign ſeems not unto me any whit firm: for that ſhivering and quaking happeneth not only in the *Arthritis*, but oftentimes likewiſe in Feavers, the *Eryſipelas*, ſmal Pox, and Meazels; and it is a ſign and token that theſe Diſeaſes are very nigh at hand; when from the Trunk of the hollow Vein and Artery (eſpecially in the back) by the branches that ariſe from them, and the extremities of the Veins and Arteries, a vapor from the vitious humor, or likewiſe the thinner part thereof is thruſt forth into the parts of the back. For although that without doubt alſo the very ſame happeneth even in other parts, yet nevertheleſs this Chilneſs and trembling is firſt of al excited in the back, by reaſon of the Spinal Marrow, and the very many Nerves there proceeding from the ſaid Spinal Marrow, and being endued with a moſt quick and exquiſite ſenſe; by the which Spinal Marrow a Chilneſs and ſhivering is likewiſe ſeen ſomtimes to aſcend, and ſomtimes to deſcend: touching which ſee more in *Hippocrates* his fifth Section, and 69. Aphoriſm. And thus much may ſuffice as touching this Controverſie.

Queſt. 8. *Whether there may any thing be gathered together in the Joynts that may make any thing unto the producing of the fit.*

NOt only *Paracelſus* and his followers (who derive the *Arthritis* from the ebullition of *Synovia*) have given me occaſion to think of this Queſtion; but likewiſe thoſe ſtrange and admirable Cures that have now and then been made in the *Arthritis* have chiefly put me upon the debate hereof. *Guilhelm. Fabricius* (in his firſt Century, Epiſt. 47. and 48.) relateth that ſome by tortures have been ſo freed from the *Arthritis* that they were never known afterward to undergo any fit thereof. Indeed by affrightment, as alſo by joy, it is a thing very wel known that many have been freed from the Arthritick Paroxyſms. But how a man ſhould in this manner perpetually be freed from the *Arthritis* or joynt-Gout, it is not ſo eaſie a thing to render the reaſon thereof, unleſs it be ſought for in the place affected. And there are likewiſe other Hiſtories of this very thing. That famous and eminent perſon, Dn. D. *Doringius* related unto me, that there was a Citizen of *Gieſſa*, who (through impatience by reaſon of his pain) with a hatchet cut off the great Toes of both his Feet; and ever after this he lived altogether free from the *Arthritis*. *Andreas Libavius* likewiſe (in his 73. Epiſt. to *Schinzerus*) relateth ſuch a ſtory as this. There was (ſaith he) a Patient, an Hoſt, or publick Inholder: A certain Phyſitian (a Chevalier, a perſon of great quality) happening to be there, having agreed with him for three hundred Florens, promiſed the Cure; and when he had received a Writing under his hand for the ſaid Sum he ſets upon it. The Patient is commanded to put his feet upon a Wooden Trunk. There were preſent the ſervants of this Noble Knight (able and ſtrong men) that were commanded to hold him down in a ſitting poſture. The Knight himſelf being provided of an Iron Maller, with ſix Nails faſtened his feet unto this Trunk of Wood; and immediately with all the ſpeed that he could, leaving his Patient crying out in a moſt miſerable manner, taketh his Horſe, and away he rideth. But in the mean time he oftentimes privately maketh enquiry whether the Diſeaſe had ever after returned. And having underſtood (after the ſpace of three yeers) that the Patient had never again been troubled with the aforeſaid Diſeaſe, he returneth back unto the Inn; and there making himſelf merry with his Hoſt, he came fully to know that the Diſeaſe was cured. And thereupon he puls forth the Writing that he had under the Hand and Seal of his Hoſt, and demandeth the Money that was promiſed him, having made it appear that he was the Phyſitian that had wrought the Cure. His Hoſt (although he had been moſt cruelly handled by him) conſenteth to ſatisfie him; and accordingly he fed him and his Followers ſo long, until they had eaten and drunk out the three hundred Florens.

From al which Hiſtories it ſeems that we may collect thus much; That in the place affected there lieth hid ſome kind of Mine, which in its own time maketh much for the exciting of the Paroxyſm. But although it be very hard to determine any thing of a certainty as touching this thing; yet notwithſtanding I wil acquaint you with my own thoughts (at leaſt in the way of a Paradox) unto which I deſire not ſtrictly to engage any man to give his conſent, but ſhal leave every one unto his own Judgment and Opinion.

All

All the parts of the Body, as they are nouriſhed by an Aliment fit and convenient for them; ſo likewiſe in ſick and Crazy Bodies, the Humors that bear a certain Analogy with them are carried up and down unto the other parts; whereupon there happeneth a vitious and corrupt Nutrition. In thoſe that are ſound that which is unuſeful for the nouriſhment of the other parts is (in men) waſted and conſumed in the Nails and Haires; and in Bruites alſo it is converted into the matter of their Hoofs and Horns. In ſuch as are unſound and ſick, the vitious Humors are alſo carried unto the parts appointed for them; which as it happeneth in other Diſeaſes, ſo we may ſee it more eſpecially in the *Plica Polonica*; in which that vitious Humor is not only driven forth unto the haires of the head, which it clammeth and as it were gleweth faſt together, but likewiſe unto the Nails of the Feet, which are thereupon made hard and black. In the Fractures of the bones the ſtone *Oſteocolla*, being taken tendeth unto the bones; and paſſeth into a *Callus*, (and this ſomtimes overgreat) as *Guilhelmus Fabricius* makes it appear unto us by examples, in his *firſt Cent. Obſervat.* 90. and 91.) if therefore Humors fit for the generating of the *Arthritis* be mingled with the blood; it is very probable that they are carryed unto the Joynts, and that with the Aliment of the bones they inſinuate themſelves into the very ſubſtance of them; and that there the Excrement proper unto the bones is collected, as a Mineral and Rudiment of the *Arthritis* that is to follow. And *Galen* ſeemeth to teach us this very manifeſtly, whiles in the 39. *Aphoriſm.* of the 5. *Section*, he telleth us that each part of the Body as it hath its Nutriment, ſo it hath likewiſe its Excrement; and that there is a ſuperfluous Humor left behind, like unto the Nature of the part where it remaineth. And indeed it is a thing very likely and agreeable unto the truth, that there ſhould be ſuch a Tartarous excrement collected, eſpecially in the appendances of the bones, which are more porous then the Reſt of the parts of the bones; and therefore (as *Andreas Laurentius* hath it in his *Second B.* and 4. *Chap.*) they are ſo framed, that they may be as it were the bellies of the Bones, in the which the Aliment of the bones may be concocted, which by degrees may be ſtreyned through into their Caverns. If therefore any ſuch humor, or Excrement, ſhall be collected in the bones, the like humor flowing thereunto, it boyleth as it were with heat; which being done, it is diffuſed into the parts lying neareſt; and there it exciteth a pain in them: and this is eſpecially done in the *Epiphyſes* or additions of the bones, out of which the Ligaments ariſe, and by which the ſenſible parts about the Joynts are knit together. But if the ſaid Humor or Excrement, be diſſipated, or poured out in any other manner, it is credible that the ſick perſon is then altogether freed from the *Arthritis*. Whereupon alſo it is not without good cauſe that ſuch Medicaments as conſume the humors about the Joynts (and wholly dry them up) are here greatly commended. And this might likewiſe have been brought for the confirmation of this Opinion, that ſuch as are Arthritick are prognoſticators of the weather (as they ſpeak) and they perceive in their Feet change of Air, and Alteration in the weather; and as the common people uſe to ſay, they have an Almanack in their Feet. Which indeed *Johannes Anglicus* (in his *Roſa Anglica*) thinketh to happen, becauſe that Air may enter into the Joynts the more freely by Reaſon of their Vacuity and Dilatation. But this Reaſon is of no moment, in regard that the pain is not in the Cavities of the Joynts; and becauſe likewiſe that other parts have greater Cavities, which yet feel no ſuch thing: but without doubt, this pain doth therefore ariſe, becauſe that the neer approaching Changes of the Air do forcibly ſtir up and move the Excrementitious humors ſticking in the Joynts.

And if any one would interpret the Opinion of *Paracelſus* and his followers in the beſt ſence, he may even here have a good ground for his ſo doing. For *Paracelſus*, and *Petrus Severinus*, teach us that the *Arthritis* is generated from the extraordinary heat and Ebullition of the *Synovia*; where if by *Synovia* they underſtand a Humor not Natural, but ſomthing that is Excrementitious collected in the Joynts, they then teach us the very ſame that hath hitherto been ſpoken of. But *Quercetan* in his *Conſil. of the Gout in the Joynts*, and *the Stone*, doth explain the ſame far more cleerly; where he determineth, that the Tartar that is heaped up together, and conteined in the Joynts is the nigheſt and moſt immediate Cauſe of the *Arthritis*; and that it is ſomtimes conteined in the Joynts, and there remaineth idle: but ſo ſoon as there is any new fluxion, (which forcibly moveth it) it then exciteth a Paroxyſm;

roxyſm; no otherwiſe, then as it is when Water is poured upon burning Lime, there is then a certain Ebullition, and heat.

Queſtion, 9. *Whether Boies, Eunuchs, Virgins, and Women may be troubled with the Gout.*

HIppocrates indeed writeth (in the *Sixth Sect.* of his *Aphor. Aph.* 28) *Eunuchs are never troubled with the Gout, neither do they ever become bald.* And in the ſame Sect. *Aphor.* 29. *A Woman* (ſaith he) *is not at all troubled with the Gout, unleſs her monthly Courſes fail her.* And ibid. Aphor. 30. *Boyes are not affected with the Gout, before the uſe of* Venus. But *Galen* in his *Comment* upon the 28. *Aph.* writeth the very truth in this manner. *It was true indeed* (ſaith he) *that in the time of* Hippocrates *Eunuchs were not at all troubled with the Gout; but it is not now found to be a truth, as well in regard of the idleneſs, as the intemperancy of their lives. For in the time of* Hippocrates *there were very few of any condition that were affected with this Diſeaſe, by Reaſon of their temperate lives, and their Extraordinary Moderation. But in this our Age, (wherein there hath been ſo great an augmentation of delights, Luxury, and pleaſures, that there cannot well be any further addition unto them) there is an infinite multitude of ſuch as are troubled with the Gout; ſome never ſo much as exerciſing themſelves, but ill digeſting and concocting their food, and continually diſtempering themſelves with all ſorts of drink, without taking any Meat at all before their drinking of ſtrong wines; and overmuch addicted to venery; and others of them (if they offend not in all and every of theſe particulars, yet) in ſome one or other of theſe exceſſes taking too great a liberty.* And in the 29. Aphor. touching Women, he writeth: *This was formerly a truth* (ſaith he) *that Women (before their monthly Courſes failed them) were not at all ſo much as attempted by the Gout, by Reaſon of thoſe few Errours and exceſſes they were guilty of in the former Age. But now adaies by Reaſon of thoſe many Exorbitancies wherein they offend, there are ſome of theſe Women afflicted with the Gout.* And *Seneca* (in his 95. *Epiſt.*) writeth notably to this purpoſe. *Women* (ſaith he) *taking the like liberty and licence with men, and equalling them therein, have thereby alſo made themſelves equal unto men in their ſufferings, and Diſeaſes of their Bodies. For they come not a whit behind men in their nightwatchings, they drink as much as men; and they even provoke men to exceſs in Oyls and ſtrong Wines; they equal men in caſting up at the mouth whatſoever they had cramb'd into their ſurfetted Bowels; and all the Wine they drink is by vomiting returned back again in ful meaſure: and they equally with men take delight in qualifying the boyling heat of their inflamed Stomacks by melting of Snow in their Mouths; neither come they ſhort of men in their wantonneſs and luſts, as being born to ſuffer. And therefore what wonder is it that the beſt of Phyſitians hath been found in a lie, in regard that there are ſo many Women troubled with the Gout? They have by their vitious lives loſt the benefit of their ſex; and having put off Womanhood, they have condemned themſelves unto mens Diſeaſes.* Thus *Seneca.* Unto which even this alſo may be added, that the Gout which at this day is ſo frequent and common, is from the Grand Parents and Parents derived upon the Children and Nephews of both Sexes. And many ſuch examples there are every where extant, that much derogate from the truth of what *Hippocrates* ſaith in his Aphoriſms. I knew a youth (a Noble mans Son of *Sileſia*) who not many years ſince coming hither to ſtudy, before he was eighteen years of Age, (although I verily believe him to be altogether free from Venery) he was oftentimes afflicted with fits of the Gout. *Antonius Muſa* (upon the 31. *Aphor.* of the *Sixth B.*) writeth that he had ſeen one *Alphonſus Daſſonius* (a Noble youth and one of great note) not above fifteen yeers old, and yet troubled with the Gout; who denied that he had ever excerciſed himſelf in the School of *Venus.* And *Hollerius* (upon the ſame *Aphor.*) writeth that he had ſeen a Boy (not above ten years old) much troubled with the Gout. And *Michael Paſchalius* (in his *firſt B. of the Meth. of Curing Diſeaſes, Chap.* 15.) tels us that he had ſeen a Noble youth (not above ſeven or eight years of Age) troubled not only with the Gout in his Feet, but with the *Arthritis* alſo, or the Gout running up and down in all the Joynts of his Body; and yet notwithſtanding this Diſeaſe in his Joynts was not at all hereditary, his Parents and Grand Parents having never been afflicted therewith. *Antonius Muſa Braſſavolus* (upon the 28. *Aphor.* of the *ſixth B.* of *Hippocrates*) relateth, that he ſaw at *Venice* an Eunuch (almoſt fourty years of Age)

a Turk,

a Turk, who was extreamly tortured with the pains of his Joynts. And the writer of the *Scholia* upon the 63. *Chap.* of the *first B.* of *Hollerius*, (*touching internal Diseases*) tell us that he saw the same. And there is no need at all, neither is it worth while to relate any examples of Women troubled with the Gout, since that they are every where so obvious, and apparent before our Eyes.

Question, 10. *Whether the* Arthritis *be Curable.*

IT is the common and received Opinion of many, that the *Arthritis* is altogether incurable. And the very truth is, there have been many found thus affected, whom the aforesaid Disease hath attended all their life long, and even unto their dying day. Whereupon it likewise happeneth that many of these Arthritick persons (conceiving their Disease to be desperate) will not at al seek unto the Physitian for his advice; and for the same reason also they refuse to abstain from any Errors in Diet. But on the contrary, there are many examples to be found of such as either by the assistance of Physitians, or by a good Diet, or by some sudden and unexpected chance and accident have been freed from the Gout, and have ever after lived altogether free from the same. *Porphyry* (in the life of *Plotinus*) writeth, that *Rogatianus*, a Senatour of Rome, a Platonist, and Scholar of *Plotinus*, by his frugal and sparing Dyet attained so much benefit in this affect, that when as before he was very violently handled and vexed with the Gout, so that he could not so much as go one step forward, but was fain to be carryed in his Chair, he hereby reassumed his strength again; and whereas before he was not able to stretch forth his hands, he by this his frugality and temperance became so wel recovered, that he had now more command of his hands, and could upon all occasions use them more expiditely then such as did their dayly drudgery with them. And so likewise above (out of *Trincavel* his 12. *B.* and 2. *Chap. Touching the manner of curing the affects of all the parts of Mans Body*) we related a story of a certain Physitian (an old man) at *Venice*, who by his abstaining from wine by the space of five years was delivered from the *Arthritis* or Gout during his whole life, even unto the very day of his Death. And we likewise related unto you before (out of *Franciscus Alexander*) of one *Francis Pecchius* (a man much troubled with the Gout) who being cast into prison, and there detained for twenty years, was in the end freed both from his imprisonment and all his Arthritick pains, and so continued free from all fits of the Gout for ever after during his Natural life: And *Marcus Gattinaria* (in *that Chap.* of his *Book*, *touching the Cure of the pains of the Joynts from a hot Cause*) writeth as concerning himself; that when he first began to suffer the fits of the Gout, this was the Course he took for the recovery of his health, and ease from his fits: to wit, first of all, he imposed upon himself an abstinence from Wine for two years, and every month he emptied his Body by Evacuations, and then he took some Pill or other for the diverting of the Humor, (the cause of his distemper) and this he made use of twice in the week; that so Nature might be diverted in her transmitting the matter unto the Joynts, and that so she might rather evacuate it by the way of siege: and by using this course for a while he was so throughly Cured, that he was never after that troubled with any such like pains. And *Carolus Piso* also (*in his Book of Diseases from Serous or Wheyish impurities*, in his *Consil. touching the Arthritis*) writeth, that a certain man who had lived all the time of his youth infested with perpetual pains of the *Arthritis*, and making his moan and continual complaints thereof; by the counsel and advice of *Nicolaus Piso*, in the flower of his Age, he wholly denyeth unto himself the use of Wine, although he were the principal of those that were set over and had the charge of a Wine-Cellar (a rare example indeed of admirable temperance) and so by thus doing he kept himself for thirty years together (al the time of his life after) altogether free from those pains. And Histories likewise testifie, that some even by a due and orderly regulating of their lives, and others again by their being reduced unto poverty, and so necessitated unto a frugality in point of Dyet, have thereby been wholly freed and delivered from the Gout. And this withal is a thing most strange and wonderful (of which *Guilhelm. Fabricius* relateth three examples, in his *First Cent.* and 79. *Observat.*) that some certain Arthritick persons there have been, who upon suspition of some Notorious Offences by them committed,

committed, have been oftentimes ſet upon the wrack, and put upon the extreameſt of all exquiſite Tortures; but when they have conſtantly maintained their own innocency, they have at once been abſolved and for ever ſet free from their Crimes, and withal from the fits of the Gout, with the which they had formerly been moſt grievouſly afflicted. And wonderful alſo is that example which the ſame Author (in his firſt *Cent. Epiſt.* 47.) relateth of a certain envious and malecontented Perſon that lay ſick of the Gout; who though he were faſtened unto his ſick Bed by his painful Diſeaſe, could not yet refrain from traducing and ſpeaking ill of others. Which when a merry conceited Fellow there preſent perceived (who had alſo himſelf been laſht by the petulancy of the others Tongue) about the dusk of the Evening (taking his opportunity when the ſick Perſon was left all alone by all his Family) enters the ſick mans Houſe privily in a ſtrange diſguiſe that he had gotten, like unto an Æthiopian or Blackmoor, and thus diſguiſed he goeth neer unto the Bed-ſide of the ſick Perſon; who aſtoniſhed with the unuſualneſs of the form, his own ſolitarineſs, and withall terrified with the darkneſs of the place it ſelf that he lay in, demandeth of him who he was, and from whence he came. The Whiſler anſwering to none of his Queſtions, but making his approach cloſer unto the Bed-ſide catcheth him by the Arms (which were likewiſe much troubled and pained with the *Arthritis*) and having thus laid hold on him he throweth him upon his back, and ſo hanging upon the ſame and crying out with all the noiſe he could make, he carrieth him out of the Chamber where he lay, ever and anon cruſhing his Feet againſt the Stairs by which he was to go down. When he was come into the Yard, he there ſets down his burden, putting the ſick Perſon upon his Feet, ſpeaking not a word to him all this while, only ſtaring him ful in the Face. And then ſuddenly again he runs towards him and made as though he would once more have ſeized upon him, and ſo have carried him out of the Houſe. But now he who before could not ſo much as ſet his Feet to the Ground, by reaſon of his Diſeaſe, nor walk at all upon plain Ground, much leſs get up any whither by the Steps, now runs as faſt as he could up Stairs, and to the top of them he gets, and ſo into his Bed-Chamber he comes, and thorow the Window with the loud noiſe he made all the Neighborhood was raiſed, and ſo come running in unto him to ſee what the matter was. He out of Breath as he was, and half dead with affrightment, tels them that he was by a Ghoſt dragg'd out of the Bed where he lay, and then being carried forth of his Lodging-room he was moſt miſerably handled; and that had he not often called upon and ingeminated the name *Jeſus* he had without doubt been gone, had there been no more men in the world: And wonderful indeed it was, that he who was before ſo ſorely afflicted with the Gout ſhould hereupon recover his health and ſtrength, and never after be troubled with any the leaſt fit of his former Diſeaſe. *Fabricius* hath there likewiſe another Hiſtory of a certain Malefactor that had the Gout, who being brought forth and led unto Execution (his puniſhment being to have his Head cut off) by that time he was come half way to the place of execution there was brought him an unexpected Pardon granted him by the Clemency of his Gracious Prince. The miſerable man was ſo affected with this good tidings, that he who til now wanted the uſe of almoſt all his extream Members, now on a ſuddain caſt himſelf on his Feet with a quick and ſpeedy motion, and lived after this for many yeers wholly free from all kind of pain and trouble that formerly he had undergone by reaſon of the Gout. And I my ſelf remember likewiſe that we had here with us not long ſince a Noble Youth, much troubled with the Gout; this Youth, the neer neighboring houſes happening one Night to be all on Fire, and the Houſe wherein he was in danger to be burnt, he ſuddenly for fear gets him out of his Bed, and down a Ladder he runs; and intending to fly into another Houſe, he fell (with that Foot where his grief lay) into a pit which the Winters Ice had made, it being now ful of Water; and ſo by this means was freed not only from the preſent fit, but likewiſe from al other pains of the Gout for the future; and ſo he lived many yeers after. Neither have we only examples of thoſe who either by an exact and accurate Diet, or by affrightment, or Joy, and the like means, have been delivered from the Gout; but we have examples of them likewiſe who have been recovered by the help of Medicaments. *Cardanus* (in his B. of admirable Cures, Numb. 16.) relateth four examples of ſuch as he himſelf had recovered of the Gout. And we have likewiſe other examples mentioned; of which we find certain of them in *Schenkius* his fifth Book of Obſervat. And *Solenander* alſo (in his 5. *Sect. Conſil.* 1.) writeth in this manner: *As we have* (ſaith he) *known many that have been cured by others, ſo we have alſo our ſelves ſet many free from the Gout for divers yeers together; and this we have done by curing them without any great ado, who before every half yeer (and ſomtimes oftner) were greatly afflicted with the Gout: of whom ſome are yet alive to teſtifie the truth of what I ſay.* And very remarkable is that

which

which *Carolus Piſo* (in the place alleadged) relateth in this manner: *One* Cornelius Perdeus Picardus *(a man well skilled in Rhetorick) was ſubject unto the Gout, from the ſeventh yeer of his age, and ſo forwards, the Arthritis returning oftentimes every yeer, and much hindering him in the proſecution of his ſtudies. This Patient adviſing with Carolus Piſo, and beſeeching him to afford what eaſe he could unto his intollerable pain, had ſo comfortable an anſwer from him, that it much cheered the yong man: for he promiſed him his deſire, if he would but only yield obedience unto theſe few Precepts of his; to wit, If he would indeed by degrees with-hold from himſelf a third part at the leaſt of his dayly allowance, and more eſpecially in that of his Drink; and in the firſt and chief place, if he would altogether abſtain from Wine; and then in the next place, if he would alwaies as careſully and exactly keep himſelf from the injuries of the Air, and eſpecially from the cold; and moreover alſo if in the night he would cover himſelf ſufficiently with Bedcloaths, ſo that conſtantly every morning, about the end of his ſecond ſleep there might appear upon his body, if not a ſweat, yet at leaſt a moiſtneſs and dewineſs as it were; and if (laſtly) he would with the Syrup of white Roſes (taken three or four times every month) purge out of his body all the ſerous or wheyiſh ſuperfluities. The yong man yieldeth obedience unto theſe Precepts for two yeers and ſomwhat more; and by this means (beyond all mens expectations) he prevented and cut off all the matter and fewel of his Diſeaſe, and ſo lived altogether free from all pain whatſoever in his joynts.*

And therefore certain it is from dayly experience, and the obſervations of Phyſitians, that many there have been troubled with the *Arthritis*, who have not been recovered and cured thereof; and on the contrary likewiſe that very many have been perfectly recovered of the ſaid Diſeaſe. Now who they be that are Curable *Hippocrates* teacheth us, 2 *Prorrhet. I am confident* (ſaith he) *and I ſpeak it ſo far as I know, or ever yet heard of (touching thoſe that are troubled with the Gout) that whoſoever of them are either aged, or have Callous and hard knobs and knots growing about their joynts, or ſuch of them as live careful and ſorrowful lives, having their bellies hard and coſtive, that al and every of theſe are (for ought I know) altogether incurable by the art of man. Indeed the Dyſentery (if it chance to happen upon it) is the beſt curer of thoſe ſick perſons; and ſo indeed alſo are other ſcourings very beneficial and profitable in this caſe, if they reach unto the lower parts. But as for ſuch as are yong, and have no hard knots as yet growing about their Joynts; if they live accurately and carefully in point of Dyet, if they be ſuch as love to ſtir by laboring and exerciſing themſelves, and ſuch as have a good mind to obey the Preſcripts of Phyſitians (every one as he is able, according to his ſeveral employment and ſtudy) theſe without doubt (if they adviſe with an underſtanding and expert Phyſitian, may be perfectly cured.* Thus *Hippocrates.* Yet nevertheleſs we may very rightly and deſervedly account the hereditary *Arthritis* among thoſe Gouts that are altogether incurable. For as al other Diſeaſes that are Hereditary, ſo likewiſe the Hereditary *Arthritis* is not to be removed and overcome without much difficulty, if ever it be done.

Now there are many Reaſons to be given, why divers of thoſe that are of themſelves curable, are yet never cured. For firſt of all, the cauſe is oftentimes in the Phyſitian, who is not ſufficiently expert in the Nature of this Diſeaſe, and the cauſe thereof. For when as there are ſo many Phyſitians that think amiſs of the Nature of this Diſeaſe, and cheriſh in themſelves falſe and erroneous Opinions touching the ſame; it is indeed no wonder, that theſe do not rightly cure it, ſince that of a Diſeaſe unknown (and the nature and cauſe thereof not underſtood) there can be no right and methodical Cure expected. And there are many Phyſitians likewiſe that with Leaden Weapons (as I may ſo ſay) fight againſt an Enemy ſo powerful and obſtinate. And then again ſecondly, the cauſe may be in the ſick perſons themſelves; who uſually offend in three things. For moſt of them are perſwaded that this their Malady is incurable; and therefore they never trouble their heads with thoughts of Phyſitian or Phyſick, neither wil they adviſe with the skilful Artiſt, but ſuffer the Diſeaſe (that at firſt might have been cured) to take ſuch deep root that it is now become altogether incurable. And ſecondly, As for ſuch of them who do conſult the Phyſitian, they likewiſe offend in three things; the firſt whereof is this, That for ſuch as are indeed able and expert, they for the moſt part ſleight theſe, and give credit unto Empericks, conſulting with every Mountebank they meet withal; by whoſe tampering with them the Diſeaſe is made the worſe, and the harder to cure. And ſecondly, they wil not continue the uſe of the Medi-ments long enough. For that that vitious diſpoſition in the body (which maketh very much for the augmenting and confirming of the Diſeaſe) as alſo that the vicious humors themſelves may be taken away (after they have by degrees been collected and heaped together) is

is not ſufficient that the ſick perſon be purged once or twice every yeer; but it will be very needful to continue the uſe of the Medicaments according to the Phyſitians preſcripe; and therfore we find the Ancients giving their Arthritick Pouders for a whol yeer together. And thirdly, another thing wherein they offend is this, That moſt of thoſe that are Arthritick deſire only the mitigation and aſſwagement of their preſent pain; and ſo that they may but be freed from the Paroxyſm they lie under, they think that the worſt is now paſt; never ſo much as troubling themſelves in adviſing, how and by what means they may prevent the like fits for the future. And laſtly, this is alſo a chief and almoſt the principal cauſe of *Arthritis* its being ſo ſeldom cured, That there are but very few who wil be perſwaded to keep an exquiſite and accurate Dyet; and they wil chuſe rather to endure the Arthritick pains, unto which they have been ſo long accuſtomed and inured, than ſubmit themſelves unto the Laws and Rules of a more ſtrict and ſevere courſe of Dyet. And very few there are of them that will deny themſelves the uſe of Wine, the drinking of which unleſs it be omitted, there is in very many Patients no hope at al of a perfect cure. And from hence it happeneth, that there are more of the Rich, and perſons of Quality that are troubled with the Gout, than there are of the poorer ſort of people, and Peaſants; in regard that theſe laſt keep a very ſpare dyet, and drink no Wine at al; whereas thoſe former guzzle in Wine too freely; and in many other points of Dyet offend far more than the poor. Neither yet notwithſtanding is this at all to be denied, That there are ſome, who although they do not commit any notorious errors in the courſe of their Dyet, yet they can hardly be freed from the Gout, becauſe that the greateſt part of their Aliment (by reaſon of the weakneſs of their bowels) is converted into vitious humors, like as we ſee that there are in others alſo vitious humors elſwhere collected. And therefore in regard that it is oftentimes impoſſible to correct that weakneſs of the bowels, the *Arthritis* likewiſe from thence proceeding wil ſcarcely ever be cured.

Queſt. 11. *Whether it be fit to purge in the beginning of the Arthritick Paroxyſm?*

THere are divers and different Opinions of Phyſitians as touching this point. For ſome there are who affirm that in the very firſt beginning of the Paroxyſm purges are therefore to be adminiſtred, that ſo by them the Humors may be drawn back from the Joynts, and that ſo the pains may be leſſened, and the fits made ſomwhat ſhorter. And they appeal likewiſe unto Experience; by which it appeareth that upon the adminiſtring of Purgations in the beginning of the Paroxyſm the ſick perſon hath been delivered from al the pain that attendeth the fit; like as before we told you of *Petrus Bayrus*, who writeth of himſelf, that he was ſo weak and impotent, that he could move no part about him but only his Tongue; and that he was carried and put upon his Cloſe-ſtool by four men; but having taken his Caryocoſtine Electuary, and after that his belly had been thereby five times looſened, and made ſoluble, he found ſuch eaſe from al his former pains, that now he could go and eaſe himſelf without any help at all, and ſo in like manner return from the Cloſe-ſtool; and that he was able alſo the very ſame day to walk from one end of his ſtudy unto the other.

But others there are, that maintain the contrary Opinion; and theſe tel us, That if the humors be moved by a purging Medicament, they then ruſh unto the Joynts and the part affected more vehemently, and with greater force and violence, as alſo in greater abundance; and ſo they excite and cauſe the greater pains. And theſe alſo refer themſelves unto Experience, by which it wil be found, that by the uſe of Purging Medicaments the pains have not only been augmented, but that likewiſe if the Purges were ever a whit more hot, and ſtronger than ordinary, the humors were then inflamed by them, and drawn unto the internal and more noble parts, and there excited burning Feavers that were both dangerous and deadly.

Ludovicus Septalius (in the 7. B. of his Animadverſions, Numb. 177.) writeth, That by forty five yeers Experience he had found that Purgations adminiſtred in the beginning of the *Arthritis* ſucceeded wel in ſome, but that others again had no benefit at al by them; and therefore he giveth us this diſtinction; When there is (ſaith he) preſent in the *Arthritis* both a fluent matter, and a ſtrength of the part expelling, as alſo a weakneſs of the recipient or part receiving; If the abundance of matter, or the ſtrength of the part expelling ſhall appear to be prevalent, then (without any further controverſie) that matter is with al ſpeed to be evacuated, and called away from the Joynts, either by a Vomit, or elſe by ſome purging Medicament. But if the looſneſs and weakneſs of the Joynts be the cauſe of the fluxion, ſo that upon every light occaſion, and whatſoever the quantity of the matter be, Nature be ſtill attempting to thruſt forth the ſaid matter (ſo ſoon as it is collected in the body) unto the Joynts, the (as he tels us) upon the taking of a purge, as the fluxion is thereby augmented,

mented, ſo Nature is likewiſe thereby rendered more weak and infirm.

But in very truth, this is a thing indeed moſt certain, That the matter doth ruſh unto this or that part with ſomtimes a greater, and ſomtimes a leſs violence and impetuouſneſs: but as for the cauſe of this fluxion, it is never the alone weakneſs of the Joynts (which only diſpoſeth the part for the more eaſie receiving of the matter, but never draweth or alureth the humor unto the part affected) but that it ſomtimes rutheth more eaſily unto this, and ſomtimes unto that part, this is rather to be aſcribed unto the Expulſive faculty, which is accuſtomed now unto this, and as ſoon again unto that way and part, for the expelling forth of the peccant humor. And therefore if there be any Fear of the matters ſudden and violent ruſhing upon the part, purgation is not thereupon preſently to be omitted; but rather ſuch a purge is to be adminiſtred that may not only move the humors, but that is able alſo wholly to evacuate them. But yet nevertheleſs, it is here the ſafeſt courſe (as *Septalius* perſwadeth us) to conſult Experience. For if we find that the pains are the more exaſperated upon the giving of a Purge once or twice, and that thereupon they continue the longer, we muſt then forbear to purge for the future. But on the contrary, if we find the pains to be hereby diminiſhed, and the Paroxyſm made more eaſie and light, we may then alſo even with boldneſs and confidence go on to purge, as there ſhal be occaſion. But it is moſt fit and convenient to purge, even at firſt, in the very beginning of the Diſeaſe. For whenas the impetuous motion of the humor unto the part affected is not as yet altogether ſo great, the humor may eaſily be drawn another way; whereas if it already with great violence ruſh unto the part affected, it is the harder to be recalled. But leſt that otherwiſe ſome Feaver ſhould be kindled, the condition of the humors, and the nature of the purges, are wel to be weighed and conſidered; and they are ſo to be tempered, that no ſuch thing may happen.

Queſt. 12. *Whether Baths be good and uſeful for ſuch as are troubled with the Gout?*

BAths are by many Phyſitians commended unto Arthritick perſons; and many alſo thus affected betake themſelves unto theſe Baths, as unto the only ſacred Anchor of their Hopes, and a moſt ſure Refuge, as from whence they expect an eaſing of al their pains and tortures. But yet on the contrary, Experience hath often taught us, that ſome even in thoſe very baths have fallen into the fits and pains of the Gout; and that others likewiſe by the uſe of the ſaid Baths have become much the worſe. And therefore ſeeing that there is a Truth in both theſe Aſſertions; to wit, That Baths are ſomtimes uſeful and good for Arthritick perſons, and now and then likewiſe very hurtful for them; we muſt firſt of all know that from Baths alone there was never yet any that ever recovered (or could ſo much as probably hope for) his perfect health and ſtrength. Neither alſo doth the *Arthritis* (as we ſhewed you before) proceed only from the weakneſs of the joynts; neither is it ſufficient to ſtrengthen the joynts, that the ſick perſon may be cured of the Gout. And moreover, that the Baths do ſomtimes help, and ſomtimes hurt the perſon thus affected, this is not to be aſcribed meerly and ſimply unto the Baths, but unto the conſtitution of the ſick perſon, and likewiſe the courſe of Dyet by him obſerved whilſt he made uſe of thoſe Baths. For if the Body ſhal be firſt rightly evacuated, ſo that there are only the reliques and remainders to be conſumed, and that the Joynts be to be ſtrengthened, Baths may then be allowed as very fit and profitable for the ſick perſon. For they do more powerfully diſſolve and diſſipate the remainders of the Humors in the joynts than do any Medicaments whatſoever, and ſo ſtrengthen the parts; and withal (if the uſe of them be temperate) they cheriſh and preſerve the Native heat of the Body. But if the Body be ſtill impure, and as yet ful of vitious humors, the Baths melt and pour al abroad theſe vitious humors; whereupon the ſick perſons ſomtimes fal into their fits in the very Baths, and ſo are forced to deſiſt from any further uſe of them; or elſe theſe humors being ſcattered and poured abroad are carried into the other parts, and unto the bowels; and there they cauſe many dangers and miſchiefs. And ſo we may even very truly conclude, that Baths are more hurtful than helpful unto perſons in this condition, unleſs they obſerve a right and due courſe of dyes, while they make uſe of them.

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a deep sore with a hole sinus: 241

sore under ãm pits and eare p: 244

and In yᵉ neck parotis 242

sores In yᵉ fingers and nails 243

A sore which dye the skin of a leading colour which
come by a fall which befall youth and women 246

a sore spreading Like a snake with a flat luminous 246

a tumor which leave the print of yᵉ finger 249 0

a tumor when it is prᵉssed runneth sense colur blue 247

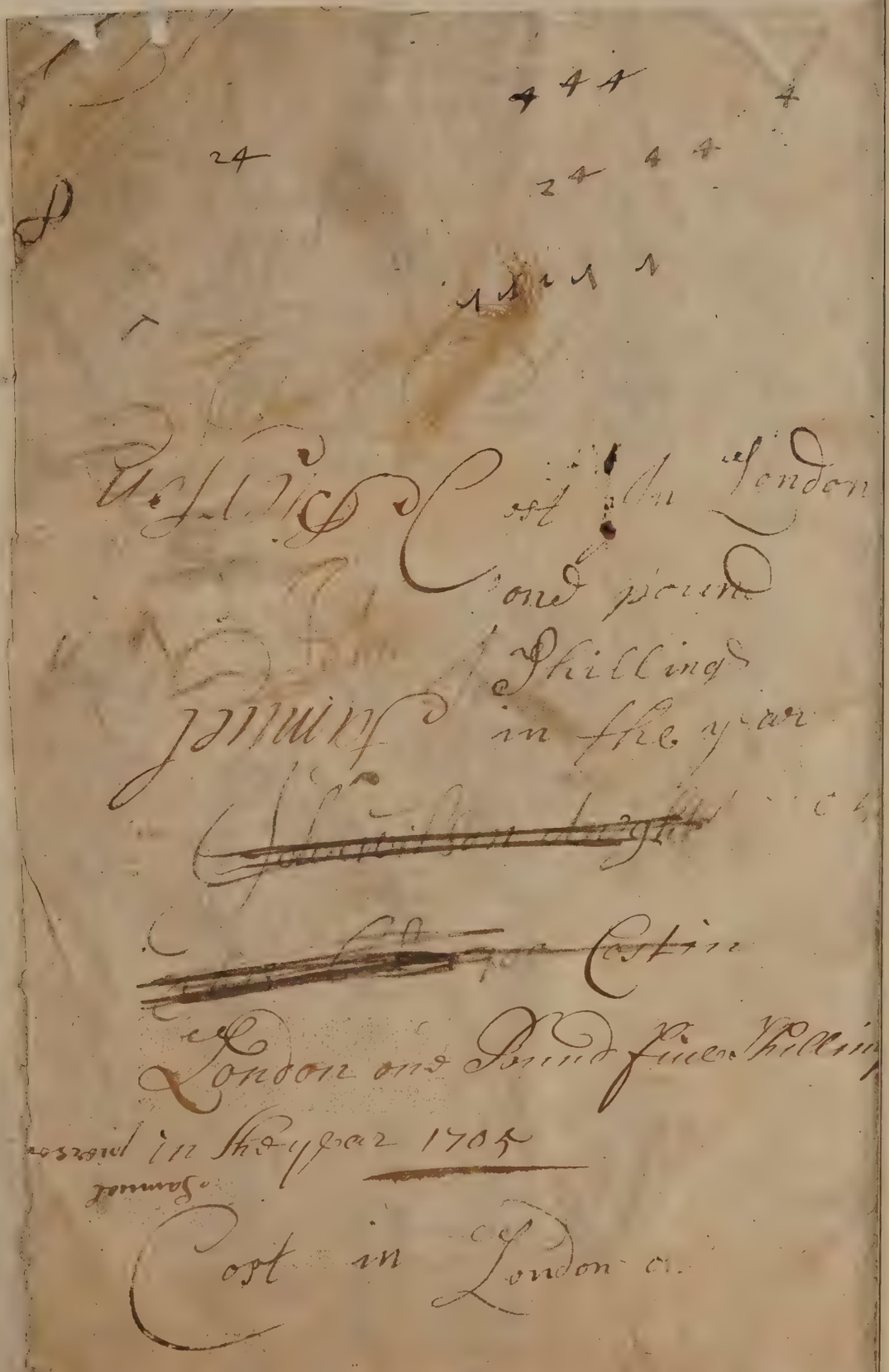
a sore about yᵉ nose mouth and chin spreading 248

1 or 2 which have Blisters and pushes 240 3

a sore that Breaketh forth as if sung by Bees

a tumor which went prick come forth Blood 249

a sore of a Bould colour and a flat humor 250

a sore which is near yᵉ joynt of knee or yᵉ like 250

a Tumor yeilding matter like honey a Tumor yielding
like a pulish and a tumor yeilding matter like suet 250